AGENDA ITEM K-7

CITY OF LODI
COUNCIL COMMUNICATION

AGENDA TITLE: **Adopt Separate Resolutions Approving Water Supply Assessment Reports for Reynolds Ranch Project and Westside-Southwest Gateway Project**

MEETING DATE: **July 19, 2006**

PREPARED BY: **Public Works Director**

RECOMMENDED ACTION: That the City Council adopt separate resolutions approving Water Supply Assessment reports for the Reynolds Ranch project and Westside-Southwest Gateway project.

BACKGROUND INFORMATION: The Water Supply Assessments for the Reynolds Ranch (Exhibit A) and Westside-Southwest Gateway (Exhibit B) projects were prepared by Public Works Department staff and Willdan Consultants, in accordance with Senate Bill (SB) 610 and Water Code Section 10912. The assessments are in the format designated in State guidelines and document that sufficient water supply is available to serve the projects. (See summary table, next page.) No entitlements are conferred upon these projects by the requested action. Approval of the assessment for each project by the water supplier is a prerequisite to Certification of the Final Environmental Impact Reports.

The Reynolds Ranch project site is located south of Harney Lane, west of State Highway 99, and east of the Union Pacific Railroad, as represented in Exhibit C. The Reynolds Ranch project is 220 acres in size, and the land uses include 20 acres of offices, 40 acres of retail commercial sites, 1,084 residential units (mix of low, medium, and high density), parks, elementary school and other uses. The annual water supply required to serve the demands of the project at completion is approximately 501 acre-feet per year.

The Westside-Southwest Gateway project site is located westerly of Lower Sacramento Road extending to the General Plan boundary, as represented in Exhibit D. The project is approximately 410 acres in size, and the land uses include 2,090 residential units, elementary school, parks and other uses. The annual water supply required to serve the demands of the project is approximately 887 acre-feet per year.

The data presented in the assessments confirm that water supplies are sufficient during normal, single-dry and multiple-dry years over a 20-year planning horizon to serve the demands of existing development, planned future development within the General Plan, and these proposed projects. A summary of this data is presented below.

However, additional future development beyond the current General Plan is expected, and as presented in the 2005 Urban Water Management Plan, demands are expected to exceed supplies by around 2025. The City will need to secure additional water supplies to serve development beyond 2025. Potential future water sources include WID, MORE project (Mokelumne River), recharge using captured storm water runoff, and banked groundwater. A complete master water supply plan will be contained in the new General Plan.

APPROVED: _____
Blair King, City Manager

Summary of Water Supply and Demands

Water Supply	Acre Feet per Year
Groundwater[a]	15,000
Supplemental Safe Yield (Reynolds Ranch)[b]	374
Supplemental Safe Yield (Westside-Southwest Gateway)[b]	695
Woodbridge Irrigation District[c]	6,000
Reduction in Demand through Conservation and Metering[d]	2,500
Total Supply	24,569
Water Demand	
Existing City	17,011
Reynolds Ranch	501
Westside-Southwest Gateway	887
Vacant Land[e]	1,378
Total Supply	19,777
Surplus Supply	4,792

[a] Safe yield of the groundwater resource underlying the existing City.
[b] Increase in safe yield of the groundwater resource underlying the project area, calculated as the product of 1.7 acre-feet per year per acre times the acreage of the project.
[c] Although an implementation plan for the use of the WID surface water has not been decided upon, credit for the supply is permitted by the WSA Guidelines.
[d] Projected reduction of 15% of existing water demand through meter installation and other conservation measures. This does not apply to new construction because the effects of metered water and conservation measures are accounted for in the calculation of water demands.
[e] Remaining vacant land based on current General Plan.

The following actions by the City Council are recommended:

Action A: Adopt resolution approving the Water Supply Assessment for Reynolds Ranch project.

Action B. Adopt resolution approving the Water Supply Assessment for Westside-Southwest Gateway project.

FISCAL IMPACT: None.

FUNDING AVAILABLE: Not applicable.

Richard C. Prima, Jr.
Public Works Director

Prepared by Wally Sandelin, City Engineer, and Paula J. Fernandez, Senior Traffic Engineer
RCP/FWS/PJF/pmf
Attachments
cc: City Attorney
Planning Manager
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EXHIBIT A

CITY OF LODI

REYNOLD'S RANCH PROJECT

WATER SUPPLY ASSESSMENT

July 2006

INTRODUCTION

This Reynolds Ranch Project (Project) Water Supply Assessment (WSA) is prepared in compliance with Senate Bill 610, effective January 1, 2002. Much of the data for this WSA has been taken from the adopted 2005 UWMP and is shown herein in italics to ensure the references. The Project meets the criteria as defined in California Water Code 10912 to be classified as a "Project" as follows:

1. It proposes the development of 1084 dwelling units.
2. It proposes a mixed use project as follows:
   a. Development of more than 500 dwelling units.
   b. Development of a shopping center/business center that may have more than 250,000 square feet of floor space.
   c. Development of a project that would demand an amount of water greater than the amount of water required by a 500 dwelling unit project.

A Notice of Preparation (NOP) as defined in CEQA has not been filed with the lead agency, County of San Joaquin, at this time. A conceptual land use plan is shown on Figure 1.

The proposed Reynolds Ranch Project consists of 220 acres of existing agricultural use land to be developed into residential, retail/commercial, office and public facility uses as shown in Table 1.

TABLE 1 REYNOLD'S RANCH PLANNED LAND USES

LAND USE	GROSS ACREAGE	DWELLING UNIT
Residential	96.6	1,084
Retail/Commercial	45.8	0
Office	20.1	0
Public Facilities	15.0	0
Parks/Open Space/Basin	20.7	0
Road Row/Interchange	21.8	0
TOTAL	**220.0**	**1,084**

The intended land uses satisfy the criteria of Project and the need for a WSA. This WSA format follows the format in the "Draft Guidebook for Implementation of SB 610 & SB 221 of 2001" prepared by the California DWR.

The Guidebook for Implementation of SB-610 and SB-221 outlined the following Sections/Steps to be addressed in Water Supply Assessments:

Section 1	Does SB-610 or SB-221 apply?	
Section 2	Who will prepare the SB- 610 assessment?	
Section 3	Has an assessment already been prepared that includes this project?	
Section 4	Is there a current Urban Water Management Plan?	
Section 5	What information should be included in an assessment?	
	Step One:	Documenting wholesale water supplies.
	Step Two:	Documenting supply If groundwater is a source If assessment relies on sources never before used
	Step Three:	Documenting project demand Detailing existing and planned future uses
	Step Four:	Documenting dry year(s) supply for water suppliers with multiple sources
	Step Five:	Documenting dry-year(s) demand
Section 6	Is the projected water supply sufficient or insufficient for the proposed project?	
Section 7	NOT INCLUDED BECAUSE SUPPLY CONSIDERED SUFFICIENT	
Section 8	Final action by lead agency. Conclusions included	

Note—In this report, SB-221 does not apply since a subdivision map has not been submitted.

LAND USE

REYNOLDS RANCH

CITY OF LODI, CALIFORNIA

LAND USE SUMMARY

LAND USE	ACRES	FIXED COUNT	UNITS
LDR	20.6	5 DU/AC	103
MDR	63.9	10.3 DU/AC	631
HDR	9.1	22 DU/AC	200
SHDR	3.0	50 DU/AC	150
C	RETAIL COMMERCIAL	40.5	
OFF	OFFICE	20.1	
MS	MINI STORAGE	5.3	
POP/FIRE	PUBLIC / QUASI PUBLIC	1.0	
S	SCHOOL	14.0	
PARK	NEIGHBORHOOD PARK	5.4	
OS	OPEN SPACE	7.3	
DB	DETENTION BASIN	8.0	
I/OR	INTERCHANGE/ON-RAMP	4.5	
IS	INTERNAL STREETS	17.3	
TOTAL		220.0		1,084

FIGURE 1
REYNOLDS RANCH
WATER SUPPLY ASSESSMENT

SB 610 – SECTIONS 1 THROUGH 4: SUPPLY ASSESSMENT PROCESS

(Sections 1 through 4 determine preparation of a WSA)

- The Project is subject to SB-610 because it proposes the development of 1084 dwelling units
- The Project is not subject to SB-221 because a subdivision map has not been submitted to the City
- The City of Lodi is the "water supplier" for the Project
- The Project has not been the subject of a WSA
- The City of Lodi adopted an Urban Water Management Plan (UWMP) in 1990 and updated the Plan in 1995 and in 2005

The Project is in the initial planning stages and no subdivision maps have been prepared for the property. Therefore, the Project is not subject to SB-221.

The City of Lodi provides water service to the existing developed area. The Project is not within the city limits but both developments are contiguous to the city limit on the west side so that the distance for any extension of service would be short. Although currently outside the city limits, the project area is within the City's sphere of influence, has been considered in the City's planning and is included within the recently adopted Urban Water Management Plan. In Figure 2, the City General Plan and Sphere of Influence boundaries are shown along with the boundary of the Westside/SW Gateway and Reynold's Ranch projects.

This WSA addresses the California Water Code requirements pertaining to the preparation of WSAs and is strictly an assessment of the City's ability to provide water service to the Project. This WSA does not constitute an agreement to serve water to the Lodi-Westside or the Lodi-Southwest Gateway projects.

As noted above, the City adopted an Urban Water Management Plan in 1990 and updated the plan in 1995 and in 2005. Much of the information included herein was presented in the 2005 UWMP and is referenced or excerpted throughout this report.

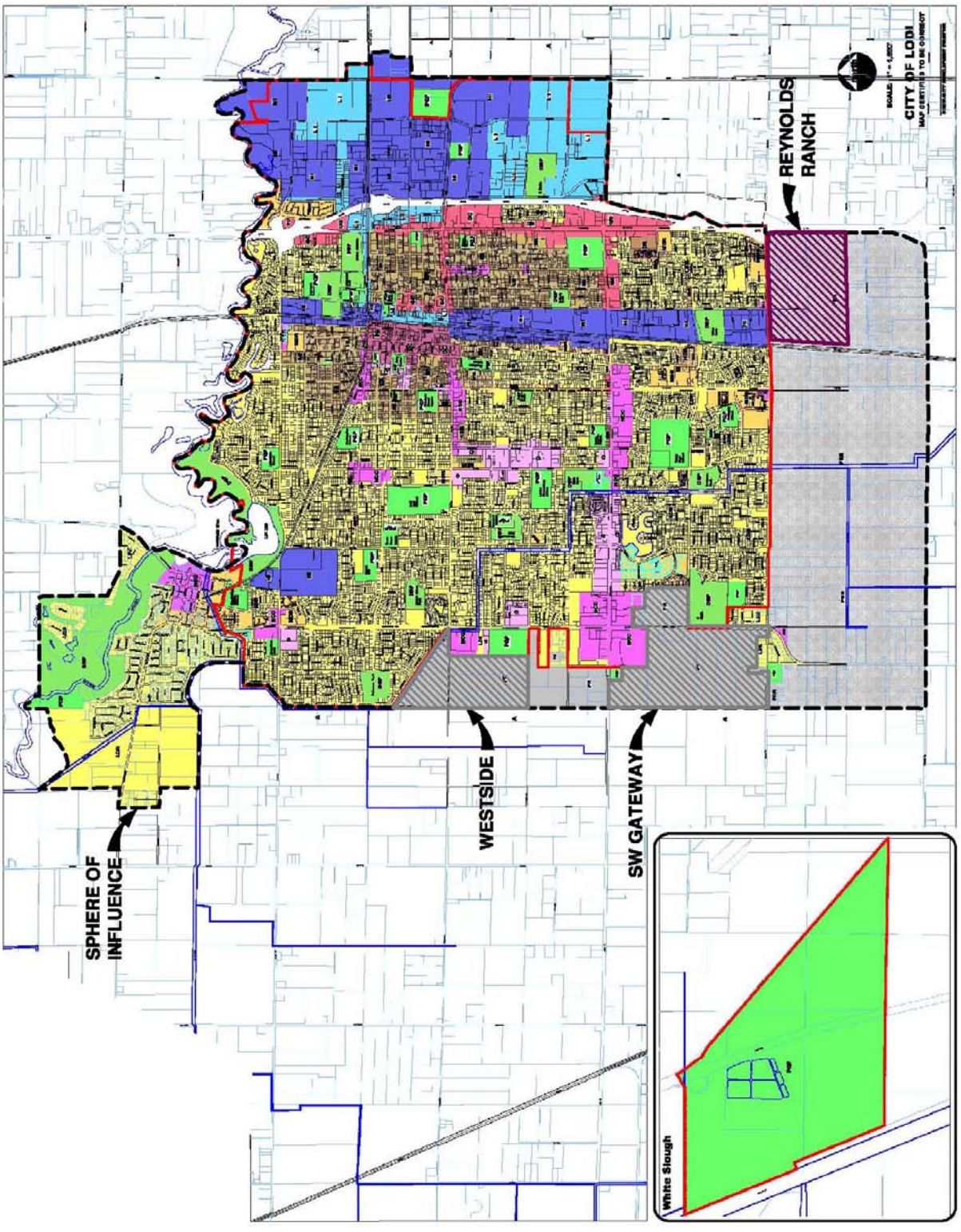


FIGURE 2
LODI GENERAL PLAN & SPHERE OF INFLUENCE
WATER SUPPLY ASSESSMENT

SECTION 5: SUPPLY AND DEMAND DOCUMENTATION

A. WATER SUPPLIES

The City adopted a Master Water Plan in 1987 for a 20-year period. The Plan indicated that the water supply was from groundwater provided at that time by 21 out of 24 wells. At that time, Well 12 was out of service due to potential contamination from gasoline but the problem was not expected to require replacement of the well. Also Wells 3 and 11 were out of service due to potential contamination by diobromochloropropane (DBCP), a commonly used fumigant and nematocide that had been identified as a potential contaminant in some of the water system wells at the time. The Plan stated that six wells were equipped with standby power and five wells had permanent chlorination equipment.

The 1987 Master Water Plan indicated that the City considered non-treatment and treatment methods to resolve the DBCP condition. Non-treatment alternatives considered were well replacement, well rehabilitation and blending with good quality groundwater. Treatment alternatives of air stripping, granular activated carbon absorption, ultraviolet irradiation with ozonation and ultraviolet irradiation with hydrogen peroxide were considered.

Currently the City still relies upon groundwater as its sole source of supply, however, in 2003 a contract for a surface water supply was executed with the Woodbridge Irrigation District that will be implemented in the near future. As indicated in the 2005 UWMP, the City water utility operates 26 wells. All wells are equipped to provide emergency chlorination and seven wells are equipped with granular activated carbon for removal of DBCP. Standby power has also been installed in seven wells and is readily available in the event of a power outage.

Table 2 identifies the type of the City's water source and whether it is by water right or by service contract and if the source of supply has been used.

TABLE 2 ANNUAL POTABLE WATER SUPPLY SOURCES

SUPPLY	QUANTITY (AFY)	WATER SUPPLY TYPE	EVER USED
Groundwater*	Well Capacity**	Appropriative Right*	Yes
WID Surface Water***	6,000	Contract	No

* The City currently uses groundwater as its sole source of supply. The City overlies a portion of the San Joaquin Valley groundwater basin, which is not currently adjudicated. As a municipal pumper, Lodi's water right is considered an appropriative right.

** The City/Utility operates 26 groundwater production wells. The 26 wells that currently provide water to the City have a combined capacity of 35,210 gallons per minute (GPM) or 50.7 million gallons per day (MGD).

*** The City recently entered into an agreement with Woodbridge Irrigation District (WID) to purchase 6,000 acre-feet per year (AFY) of surface water for a period of 40 years. (Source: 2005 UWMP)

As noted in the UWMP, the City has no additional water projects currently under development and has little or no opportunity for traditional transfers or exchanges. However, a recent contract with Woodbridge Irrigation District to divert 6,000 AFY of surface water supplies to the City is in place and the City is considering how this resource would be most effectively utilized. Development plans and project construction will proceed once the City Council has selected a resource utilization strategy. In addition, the City is actively seeking additional water supplies and has several potential programs under consideration.

B. STEP 1. DOCUMENTATION OF WHOLESALE WATER SUPPLIES

As noted above, the City currently uses groundwater supplies solely for its potable water; however, on May 13, 2003 the City executed an agreement with the Woodbridge Irrigation District to purchase 6000 AFY of surface water for a period of 40 years. The Agreement provides for an extension of the agreement for forty years and for banking water not used for three years up to 18,000 AF. The City plans to start using this water supply in 2010.

C. STEP 2. DOCUMENTATION OF GROUNDWATER SUPPLIES

The City currently uses groundwater as its sole source of supply. The city delivered an average of 15.19 MGD in 2004. The average day demand from 1995 to 2004 was 14.94 MGD and the maximum day demand was 28.62 MGD, which provides a ratio of 1.91 as a peaking factor that can be used to scale annual demand projections to maximum day demands. To meet these demands, there are currently 26 production wells in operation, which have a capacity of 35,210 gallons per minute or 50.7 million gallons per day (MGD).

At first glance, the City would appear to have an excessively large number of wells. However, the City has long pursued a strategy of using wells to meet peak flow and fire flow demands. By doing so, the City has been able to reduce the pipe size of the water distribution system and negate the need for surface water storage. Ratepayers have benefited with reduced infrastructure and maintenance costs. The reliance on ground water for peak flows is likely to remain a standard strategy as the large groundwater basin size and recharge rates are such that the impact of short-term high demands will be negligible.

D. GROUNDWATER SUPPLY PROJECTIONS

1. Groundwater Assessment

Summarized Excerpts from Chapter 3 of the City's 2005 UMWP: 3.2.2 Future Groundwater Supply.

The continuing decline of groundwater levels in the aquifer underlying the City means that the sustainable annual groundwater supply available to the City is something less than what is currently extracted. As a member agency of GBA, the City is participating in the development of policies and programs, including

groundwater recharge and conjunctive use programs, intended to help eliminate the eastern San Joaquin County groundwater basin overdraft condition. Additionally, the City plans to reduce its overall groundwater pumping in the future. A safe yield of approximately 15,000 AFY (Treadwell and Rollo 2005) has been estimated for the aquifer serving Lodi based on water balance calculations (see Appendix G) performed using data primarily from the Eastern San Joaquin Groundwater Management Plan (Appendix F). This safe yield estimate reflects an acreage-based relationship. Therefore, as the City's land area increases, the estimated safe yield of the underlying aquifer will likely increase. The safe yield estimate will be revisited in the 2010 UWMP update. For the purposes of this UWMP, 15,000 AFY has been assumed as the amount of groundwater available during all future (post-2005) years. Although rigorous scientific analyses have not been performed, the City projects that some recharge of the groundwater basin will occur as the amount of groundwater pumped annually decreases. This result, however, is contingent on the cooperative efforts of all groundwater users within the basin, including other cities, agriculture, and private well owners, to reduce groundwater extraction. The City does not expect development of cones depression, significant changes in direction or amount of groundwater flow, changes in the movement or levels of contaminants, or changes in salinity and/or total dissolved solids (TDS) concentrations. The amount of groundwater that is projected to be pumped over the next 25 years is presented in Table 3-4.

Groundwater Pumping Projection

TABLE 3-4 PROJECTED GROUNDWATER PUMPING (Guidebook Table 7)

	2005	2010	2015	2020	2025	2030
Annual Volume, (AFY)	17,300	15,000	15,000	15,000	15,000	15,000
Percent of Total Available Supply[a]	57%	52%	51%	50%	49%	48%

a. Refers to the total supplies shown in Table 3-5.

E. SURFACE WATER SUPPLY PROJECTIONS

3.2.3 Future Surface Water Supply (2005 UWMP excerpt)

As discussed in Section 3.1.4, in May 2003 the City entered into a 40-year agreement with WID for 6,000 AFY of surface water from the Mokelumne River. The diversion point has not yet been determined. The City is considering options for implementing this source before 2010. Therefore, 6,000 AFY of treated surface water is included in the supply projections presented in Table 3-5 below. The City is also considering the possibility of purchasing additional surface water supplies from WID; these supplies are not included in Table 3-5, however, as they are not considered "firm" supplies. (Note: The Agreement with WID is renewable for an additional 40 years, for a total of

80 years. The City Council is currently reviewing groundwater options for utilizing the surface water to serve current and future water demands.)

F. TOTAL GROUNDWATER AND SURFACE WATER PROJECTION

TABLE 3-5 CURRENT AND PLANNED WATER SUPPLIES (Guidebook Table 4)

SOURCE (AFY)	2005	2010	2015	2020	2025	2030
Groundwater[a], AFY	17,300	15,000	15,000	15,000	15,000	15,000
WID Surface Water, AFY	6,000	6,000	6,000	6,000	6,000	6,000
Recycled Water[b], AFY	7,200	7,700	8,300	8,940	9,630	10,380
TOTAL[c], AFY	**30,500**	**28,700**	**29,300**	**29,900**	**30,600**	**31,400**

a. Refer to Section 3.2.2 for more information
b. Based upon the amount of wastewater treated during 2004, according to City staff. Future recycled water supplies are extrapolated from the 2004 amount. Assumes the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to nearest hundred.

Source: 2005 UWMP

SECTION 6: STEPS 3 AND 4 - DEMAND

For the 2005 UWMP, records of historical water production were obtained from the City's Public Works Department. The records included both maximum day and annual water production records. Water production is the volume of water measured at the source and includes all water delivered to residential, commercial, and public connections and also includes unaccounted-for water. The records are available from 1970 at the Department of Public Works.

EXCERPTED from the 2005 UWMP to provide the data outlined in Step 3, Detailing Existing and Planned Future Uses, as presented in the Guidebook for Implementation of SB 610, are pages 2-1 to 2-3, pages 3-1 to 3-8, and pages 4-1 to 4-7 with sections entitled:

Chapter 2 Supplier Service Area

2.1 Service Area Description
2.2 Climate
2.3 Other Demographic Factors
2.4 Population Projections

Chapter 3 Water Supply

3.1 Current Water Supply
- 3.1.1 Background
- 3.1.2 Water Supply Facilities
- 3.1.3 Current Groundwater Supply
- 3.1.4 Current Surface Water Supply
- 3.1.5 Current Recycled Water Supply
- 3.1.6 Water Distribution System

3.2 Future Water Supply
- 3.2.1 Constraints on Existing Supplies
- 3.2.2 Future Groundwater Supply
- 3.2.3 Future Surface Water Supply
- 3.2.4 Future Recycled Water Supply
- 3.2.5 Planned Water Supply Projects

3.3 Exchange or Transfer Opportunities
3.4 Desalinated Water
3.5 Wholesale Supplies

Chapter 4 Water Demand

4.1 Past, Current, and Projected Water Demand
- 4.1.1 Past and Current Demand
- 4.1.2 Future Water Demand

4.2 Sales to Other Agencies
4.3 Other Demands
4.4 Total Demands

The aforementioned noted EXCERPTS are as follows:

CHAPTER 2. SUPPLIER SERVICE AREA

2.1 Service Area Description

The City is located in the Northern San Joaquin Valley in San Joaquin County and borders the Mokelumne River. The bulk of the City's geographical area extends from the Mokelumne River on the north, WID South Main Canal and Lower Sacramento Road on the west, Harney Lane on the south, and portions of Highway 99 and Central California Traction (CCT) Railroad on the east. The City's White Slough Water Pollution Control Facility (WSWPCF) lies approximately six miles to the southwest of the City. The City has an estimated 2005 population of 62,467 (California Department of Finance, 2005).

The City of Lodi Water Utility (Utility) is the sole water purveyor for the City of Lodi. The Utility's service area is contiguous with the City boundaries and covers approximately 12 square miles. There are a few minor connections outside the City. The service area includes a mix of residential, commercial, and industrial land use, and is characterized by essentially flat terrain. All future development being considered for the City is expected to occur within the present service area.

2.2 Climate

The City has cool, humid winters, and hot, dry summers. Temperatures average 60 ℉ annually, ranging from average winter morning lows in the upper 30s to average summer afternoon highs in the upper 80s (Western Regional Climate Center, 2005). Relative humidity ranges from 91% in winter months to 26% in summer months. During summer months, temperatures may exceed 100 ˚F, impacting water demands significantly. Annual rainfall averages approximately 18 inches, with most rainfall occurring between November and April. The combination of warmer temperatures and low precipitation during the summer results in peak water demands during that period. Reference evapotranspiration (ETo) values, which serve as indicators of how much water is required to maintain healthy agriculture and landscaping, range from 0.93 inches during December to 8.06 inches in July. Temperature, rainfall and evapotranspiration averages for the City are presented in Table2-1.

TABLE 2-1 SERVICE AREA CLIMATE (GUIDEBOOK TABLE 3)[a]

MONTH	JAN	FEB	MARCH	APRIL	MAY	JUNE
Average ET_o[b] (in)	1.24	1.96	3.41	5.10	6.82	7.80
Average Rainfall[c] (in)	3.47	2.95	2.60	1.35	0.49	0.13
Average Temperature[c] (F)	45.65	50.40	54.15	58.90	64.90	70.30

MONTH	JULY	AUG	SEPT	OCT	NOV	DEC	ANNUAL
Avg ET_o[b] (in)	8.06	7.13	5.40	3.72	1.80	0.93	**54.3**
Avg Rainfall[c] (in)	0.04	0.05	0.30	0.93	2.29	3.03	**17.63**
Avg Temp[c] (F)	73.70	72.70	69.95	62.60	52.55	45.65	**60.12**

b. The term "Guidebook X" refers to the table in the Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan by DWR.
c. California Irrigation Management Information System (CIMIS).
d. Western Regional Climate Center.

2.3 Other Demographic Factors

Lodi is built on a strong and broad based agricultural industry with national and industrial markets for its commodities and products. Wines, processed foods, nuts, fruit and milk are major commodities of the Lodi area and provide the basic material for food processing and packaging. These commodities support the operations of General Mills and Pacific Coast Producers, three (actually two) *companies in the business of processing local agricultural commodities. In addition, Lodi has a wide range of small, financially sound businesses. These companies range in size from 10 to 150 employees and produce a wide variety of products, services, and commodities.*

Recently, there has been an increase in industrial and residential development within the City. This new development, combined with the growing strength of the wine/grape industry, is a positive economic indicator for Lodi. These industries collectively have created approximately 850 new jobs.

The demographic factors affecting the City's water supply management planning include data on the largest customers, including those listed in Table 2-2 below.

TABLE 2-2 LARGE WATER CUSTOMERS

CUSTOMER	2004 WATER USE, MO	% OF TOTAL SYSTEM
Lodi Unified School District	150,703,608	2.7
Pacific Coast Producers	130,632,769	2.4
City of Lodi (incl. parks)	113,024,617	2.0
General Mills	69,261,284	1.2
Cottage Bakery	35,077,460	0.6
Lodi Memorial Hospital	28,502,316	0.5
Certainteed	7,763,492	0.1
Valley Industries	8,334,291	0.2
Wine & Roses	8,371,534	0.2
Miller Packing Co.	8,442,676	0.2
TOTAL	**560,114,047**	**10.1%**

2.4 Population Projections

Currently, the City's population is approximately 62,467. Based upon the City's assumed annual population growth rate of 1.5%, which was presented in the Lodi Wastewater Master Plan (West Yost & Associates, 2001) and reaffirmed during discussions with City staff, population in 2030 is expected to be approximately 90,636. Population projections from 2005 to 2030 are presented in Table 2-3 below. In addition, Table 2-3 presents population projections based on population growth rates of 1% and 2%; the population projections for these growth rates are provided for comparative purposes only.

TABLE 2-3 CURRENT AND PROJECTED POPULATION (GUIDEBOOK TABLE 2)

POPULATION GROWTH RATE[b]	SERVICE AREA POPULATION					
	2005[a]	2010	2015	2020	2025	2030
1.00%	62,467	65,653	69,002	72,522	76,222	80,110
1.50%	62,467	67,295	72,496	78,098	84,134	90,636
2.00%	62,467	68,969	76,147	84,072	92,823	102,484

a. California Department of Finance (DoF).
b. For the purposes of this UWMP, the City has assumed an annual population growth rate of 1.5%, used in previous reports (e.g., Wastewater Master Plan) for facilities planning. Growth rates of 1% and 2% are shown here for comparative purposes only.

As an additional comparison, the City's existing (1991) General Plan estimated the City's population for 2007 at 71,944 (not including the Planned Residential Reserve area), and 96,589 (including the Planned Residential Reserve area). The higher population estimates presented in the existing General Plan reflect a 1987-2007 growth rate of 2.0%.

CHAPTER 3. WATER SUPPLY

3.1 Current Water Supply

3.1.1 Background

The City currently uses groundwater as its sole source of supply. The City overlies a portion of the San Joaquin Valley groundwater basin, which is not currently adjudicated. The groundwater in the Lodi area exists under unconfined and semi-confined conditions. The Mehrten Formation is the most productive fresh water-bearing unit.

The City is located within the geomorphic province known as the Central Valley, which is divided into the Sacramento Valley and the San Joaquin Valley. The Central Valley is a large, northwestward-trending, asymmetric structural trough that has been filled with several miles of thick sediment (USGS 1986). The City lies within the San Joaquin Hydrologic Basin (DWR, Bulletin 118) that straddles portions of both the

Sacramento and San Joaquin Valleys. Sediments of the San Joaquin Valley consist of interlayered gravel, sand, silt, and clay derived from the adjacent mountains and deposited in alluvial-fax, floodplain, flood-basin, lacustrine, and marsh environments. Hydrogeologic units in the San Joaquin Basin include both consolidated rocks and unconsolidated deposits. The consolidated rocks include 1) the Victor Formation, 2) the Laguna Formation, and 3) the Mehrten Formation. The consolidated rocks generally yield small quantities of water to wells except for the Mehrten Formation, which is an important aquifer (DWR). The unconsolidated deposits include) continental deposits, 2) lacustrine and marsh deposits), 3) older alluvium, 4) younger alluvium, and 5) flood-basin deposits. The continental deposits and older alluvium are the main water-yielding units in the unconsolidated deposits.

Groundwater flow direction is generally toward the south in agreement with the regional groundwater flow gradient but may vary from south-southwest to south-southeast with local gradients likely influenced by pumping form municipal supply wells. Pumping tests on municipal wells indicate that they possess a large capture zone, and thus have a large influence upon groundwater flow. Pumping of municipal supply wells in the City is performed between 100 and 500 feet below ground surface (Geomatrix, 2006).

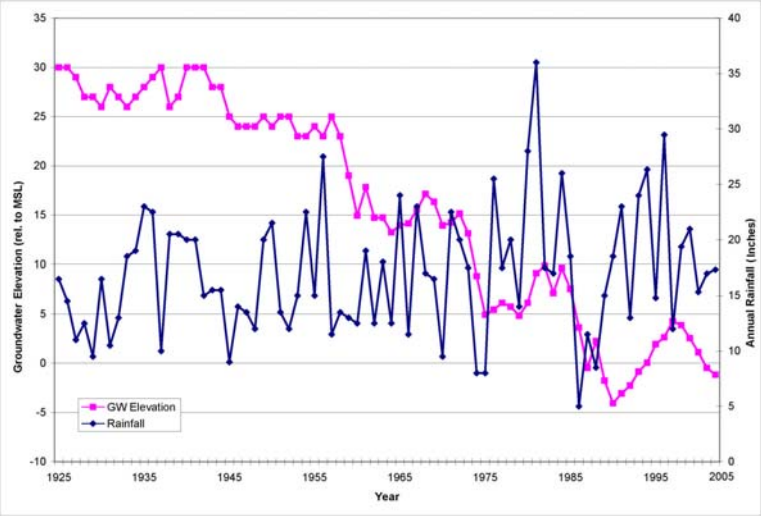


FIGURE 3-1. HISTORICAL GROUNDWATER ELEVATION
Source: City of Lodi Public Works Department

DWR has declared that the groundwater basin underlying Eastern San Joaquin County is overdrafted, and groundwater levels in the County and the City are generally decreasing. The groundwater levels also fluctuate over time depending on precipitation, aquifer recharge, and pumping demands. Groundwater elevations relative to mean sea level (MSL), and the corresponding annual precipitation from 1927 through 2004 are shown in Figure 3-1. Overall, the average annual decrease in groundwater levels from 1927 to 2004 has been 0.39 feet per year. Generally, groundwater elevations have decreased with the increase in population and water production. However, annual rainfall also influences groundwater elevation. The groundwater level increase from 1981 to 1984 can be partially attributed to the increase in annual rainfall from 1981 to 1983. Groundwater elevations for the years 1927 to 1961 were obtained from East Bay Municipal Utilities District (EBMUD) for the City's 12 square mile area. Groundwater elevation data from 1962 to the present were obtained from the City's Public Works Department for Well No. 2, one of the oldest production wells in the City.

3.1.2 Water Supply Facilities

The Utility operates 26 groundwater production wells. The locations of the wells are presented in Figure 3-2 and discussed in further detail below.

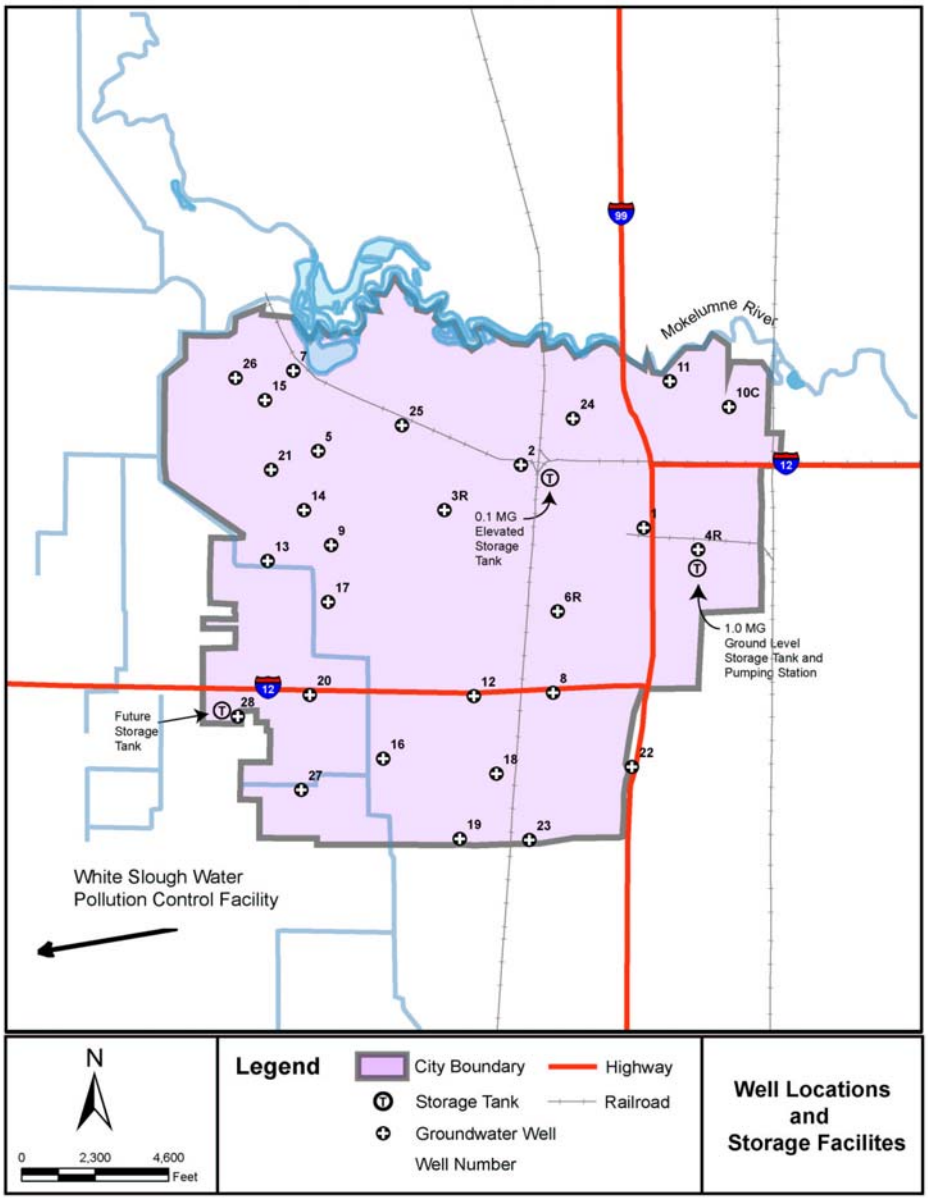


FIGURE 3-2. WELL LOCATIONS AND STORAGE FACILITIES

3.1.3 Current Groundwater Supply

The 26 wells that currently provide water to the City have a combined capacity of 35,210 gallons per minute (gpm), or 50.7 million gallons per day (mgd). The wells operate automatically on water pressure demand and pump directly into the distribution system. All wells are equipped to provide emergency chlorination as needed. Historically, water has not required chlorination. Six wells are equipped with

granular activated carbon (GAC) for the removal of diobromochloropropane (DBCP). Capacity information for the existing wells is summarized in Table 3-1.

TABLE 3-1 GROUNDWATER WELL CAPACITY

WELL NUMBER	WELL CAPACITY, GPM[b]	WELL CAPACITY, MGD[c]
1R	1,130	1.6
2	820	1.2
3R	820	1.2
4R[a]	1,960	2.8
5	1,180	1.7
6R	1,580	2.3
7	1,160	1.7
8	800	1.2
9	900	1.3
10C	1,300	1.9
11R	1,320	1.9
12	800	1.2
13	1,150	1.7
14	1,670	2.4
15	1,500	2.2
16[a]	1,110	1.6
17	1,800	2.6
18[a]	1,800	2.6
19	1,110	1.6
20[a]	2,070	3.0
21	2,050	3.0
22[a]	1,400	2.0
23[a]	1,410	2.0
24	1,420	2.0
25	1,580	2.3
26	1,370	2.0
TOTAL	**35,210**	**50.7**

a. Wells equipped with GAC
b. gpm = gallons per minute
c. mgd = million gallons per day

Table 3-2 presents the amounts of groundwater extracted by the City between 1970 and 2004.

TABLE 3-2 HISTORICAL GROUNDWATER PRODUCTION (GUIDEBOOK TABLE 5)[a]

YEAR	GROUNDWATER PRODUCTION, AF	PERCENT OF TOTAL WATER SUPPLY
1970	11,462	100%
1971	12,303	100%
1972	11,686	100%
1973	12,204	100%
1974	12,002	100%
1975	12,294	100%
1976	13,607	100%
1977	10,578	100%
1978	11,477	100%
1979	12,349	100%
1980	12,312	100%
1981	12,487	100%
1982	11,560	100%
1983	11,539	100%
1984	13,997	100%
1985	14,813	100%
1986	15,080	100%
1987	15,304	100%
1988	15,359	100%
1989	14,653	100%
1990	15,387	100%
1991	13,313	100%
1992	13,985	100%
1993	14,013	100%
1994	14,301	100%
1995	14,390	100%
1996	15,102	100%
1997	16,330	100%
1998	14,461	100%
1999	16,588	100%
2000	16,724	100%
2001	17,108	100%
2002	16,641	100%
2003	16,185	100%
2004	17,011	100%

a. The term “Guidebook X” refers to the table in the Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan by DWR.

3.1.4 Current Surface Water Supply

In May 2003, the City entered into an agreement with Woodbridge Irrigation District (WID) to purchase 6,000 acre-feet per year (AFY) of surface water for a period of 40 years. However, at the time this UWMP was prepared, the City had not yet begun using water from this supply. A copy of the City's agreement with WID is included in Appendix D.

3.1.5 Current Recycled Water Supply

The City's wastewater discharge permit requires an agronomic application rate. According to discussions with City staff, approximately 2,500 AFY of secondary treated recycled water is currently used, primarily for irrigation in the area surrounding WSWPCF. This represents approximately 35% of the total treated wastewater produced at WSWPCF. The City discharges the non-irrigation water, treated to Title 22 tertiary standards, to the Delta. The Utility currently lacks the necessary infrastructure to distribute additional recycled water to more of its customers.

For a more detailed discussion of the City's recycled water supply, as well as the processes by which it is treated, refer to Chapter 8.

3.1.6 Water Distribution System

The City of Lodi's distribution system consists of a 100,000 gallon elevated storage tank, a 1 million gallon (MG) storage facility and pumping station, and the piping system. The 1 MG storage tank, located east of Highway 99 on Thurman Street, stores groundwater from an onsite well to meet peak hour demands and fire flows. The 100,000 gallon elevated storage tank is located on North Main Street. The storage facilities and their capacities are presented in Table 3-3. Their locations are shown in Figure 3-2.

TABLE 3-3 WATER STORAGE FACILITIES

STORAGE FACILITY	STORAGE VOLUME, MG
Elevated Storage Tank	0.10
Ground Level Storage Tank	1.00
TOTAL	**1.10**

Distribution mains in the City's piping system range from 14 inches to 2 inches in diameter, and the entire distribution system consists of approximately 225 miles of pipe. The City is in the process of replacing the two-inch and three-inch diameter mains as well as other deficient pipes.

A summary of the City's current and planned water supplies is presented in Table 3-5.

3.2 FUTURE WATER SUPPLY

3.2.1 Constraints on Existing Supplies

The City's current water supply system is constrained by 1) the pumping capacity of its currently active wells, and 2) a longer-term reduction in supply due to the overdrafting currently taking place in the City's groundwater basin. Although the declining groundwater basin is a result of groundwater extraction by all groundwater pumpers in the area, including other cities, agriculture, private well owners, and the City itself, the City plans to reduce its groundwater pumping in the long term as part of what will have to be a regional effort to stabilize the groundwater basin. A copy of the GBA Groundwater Management Plan is included in Appendix F.

3.2.2 Future Groundwater Supply

The continuing decline of groundwater levels in the aquifer underlying the City means that the sustainable annual groundwater supply available to the City is something less than what is currently extracted. As a member agency of GBA, the City is participating in the development of policies and programs, including groundwater recharge and conjunctive use programs, intended to help eliminate the eastern San Joaquin County groundwater basin overdraft condition. Additionally, the City plans to reduce its overall groundwater pumping in the future. A safe yield of approximately 15,000 AFY (Treadwell and Rollo, 2005) has been estimated for the aquifer serving Lodi based on water balance calculations (see Appendix G) performed using data primarily from the Eastern San Joaquin Groundwater Management Plan (Appendix F). This safe yield estimate reflects an acreage-based relationship. Therefore, as the City's land area increases, the estimated safe yield of the underlying aquifer will likely increase. The safe yield estimate will be revisited in the 2010 UWMP update. For the purposes of this UWMP, 15,000 AFY has been assumed as the amount of groundwater available during all future (post-2005) years. Although rigorous scientific analyses have not been performed, the City projects that some recharge of the groundwater basin will occur as the amount of groundwater pumped annually decreases. This result, however, is contingent on the cooperative efforts of all groundwater users within the basin, including other cities, agriculture, and private well owners, to reduce groundwater extraction. The City does not expect development of cones of depression, significant changes in direction or amount of groundwater flow, changes in the movement or levels of contaminants, or changes in salinity and/or total dissolved solids (TDS) concentrations. The amount of groundwater that is projected to be pumped over the next 25 years is presented in Table 3-4.

TABLE 3-4 PROJECTED GROUNDWATER PUMPING (GUIDEBOOK TABLE 7)

YEAR	2005	2010	2015	2020	2025	2030
Annual Volume, AF	17,300	15,000	15,000	15,000	15,000	15,000
Total Available Supply, %[a]	57%	52%	51%	50%	49%	48%

a. Refers to the total supplies shown in Table 3-5.

3.2.3 Future Surface Water Supply

As discussed in Section 3.1.4 in May 2003 the City entered into a 40-year agreement with WID for 6,000 AFY of surface water from the Mokelumne River. The diversion point has not yet been determined. The City is considering options for implementing this source before 2010. Therefore, 6,000 AFY of treated surface water is included in the supply projections presented in Table 3-5 below. The City is also considering the possibility of obtaining additional surface water supplies from WID; these supplies are not included in Table 3-5, however, as they are not yet considered "firm" supplies.

3.2.4 Future Recycled Water Supply

As discussed in Section 3.1.5, the City currently treats approximately 7,200 AFY of wastewater at WSWPCF, of which 2,500 AFY is recycled in the vicinity of WSWPCF. WSWPCF has adequate capacity to treat all wastewater flows to Title 22 standards. The City is in the process of developing a Recycled Water Master Plan (RWMP) that will outline additional distribution of this supply to the Utility's customers. For the purposes of this UWMP, all treated wastewater produced at WSWPCF has been treated as recycled water supply and is included in Table 3-5 below. The amount of recycled water available increases with time, because as the City's population increases, the amount of wastewater available for reclamation will also increase. For a more detailed discussion of recycled water supply projections, refer to Section 8.6.

TABLE 3-5 CURRENT AND PLANNED WATER SUPPLIES (GUIDEBOOK TABLE 4)

WATER SUPPLY SOURCE AFY	2005	2010	2015	2020	2025	2030
Groundwater, AFY	17,300	15,000	15,000	15,000	15,000	15,000
WID Surface Water, AFY	6,000	6,000	6,000	6,000	6,000	6,000
Recycled Water[b], AFY	7,200	7,700	8,300	8,940	9,630	10,380
TOTAL[c], AFY	**30,500**	**28,700**	**29,300**	**29,900**	**30,600**	**31,400**

a. Refer to Section 3.2.2 for more information.
b. Based on the amount of wastewater treated during 2004, according to City staff. Future recycled water supplies are extrapolated from the 2004 amount. Assumes that the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to nearest hundred.

3.2.5 Planned Water Supply Projects

At the present time the City does not have approved plans for any additional water supply projects. The City has participated in the Mokelumne River Regional Water Storage and Conjunctive Use (MORE WATER) Feasibility Analysis. The MORE WATER project, if approved, would capture unappropriated flows from the Mokelumne River for storage and beneficial use.

3.3 EXCHANGE OR TRANSFER OPPORTUNITIES

The City does not currently have any approved plans to pursue exchange or transfer opportunities.

3.4 DESALINATED WATER

At the present time the City does not foresee any opportunities for the use of desalinated water, which includes ocean water, brackish ocean water, and brackish groundwater, as long-term supplies.

3.5 WHOLESALE SUPPLIES

Since surface water will be purchased from WID, WID is considered a wholesale water supplier by DWR. As such, the City has provided demand projections to WID for the next 25 years. Similarly, the City has received availability projections from WID for the same time period. These demand and availability projections are presented in Table 3.6 and Table 3-7 below. As discussed previously, the City has not yet begun to use this water supply. As stated in the City's contract with WID, any water not taken by the City during the first three years of the contract (May 2003 to May 2006) may be "banked" and delivered to the City in subsequent years, provided WID has sufficient water available. The banked supply may not exceed 18,000 AF. To date, over 16,000 AF of water has been banked. The City has not made any formal plans at this time to use any of its banked supply, in addition to the normal 6,000 AFY, for any of the years shown in the tables below. However, the projected supplies and demands shown below may increase if and when the City decides to use its banked supply. The magnitude and availability of banked supply to be delivered will be discussed with WID at an appropriate time(s) in the future.

TABLE 3-6 DEMAND PROJECTIONS FOR WHOLESALE SUPPLY

WHOLESALE SUPPLY	PROJECTED DEMAND[a]					
	2005[a]	2010	2015	2020	2025	2030
WID Surface Water, AFY	0	6,000	6,000	6,000	6,000	6,000

a. Subject to change with WID and City approval. Although the City may take water deliveries in excess of 6,000 AFY from its "banked" supply, no formal plans to do so have been developed at this time.

TABLE 3-7 AVAILABILITY PROJECTIONS FROM WHOLESALE SUPPLIER

WHOLESALE SUPPLY	PROJECTED AVAILABILITY[a]					
	2005[a]	2010	2015	2020	2025	2030
WID Surface Water, AFY	6,000	6,000	6,000	6,000	6,000	6,000

a. Subject to change with WID and City approval. Although the City may take water deliveries in excess of 6,000 AFY from its "banked" supply, no formal plans to do so have been developed at this time.
b. Reliability of WID supply is indicated in the City's contract with WID in Appendix D.

Wholesale supply reliability is presented in Chapter 6. Although changes in deliverable volumes of water for future hydrologic scenarios have not been formally predicted at this time, Chapter 6 presents the most restrictive possible cases for the future.

CHAPTER 4. WATER DEMAND

4.1 Past, Current, and Projected Water Demand

Water demand projections provide the basis for sizing and staging future water supply facilities. Water use and production records, combined with projections of population and urban development, provide the basis for estimating future water requirements. This chapter presents a summary of available demographic and water use data and the resulting projections of future water needs for the City.

4.1.1 Past and Current Water Demand

Records of historical water production were obtained from the City's Public Works Department. These data include both maximum day and annual water production. Water production is the volume of water measured at the source, which includes all water delivered to residential, commercial, and public authority connections, as well as unaccounted-for water.

***Annual Water Production** - Groundwater production from 1970 to 2004 is presented in Table 3-2. Total water production in 2004 was 17,011 acre-feet (AF). Water use by customer class can only be estimated, as most of the Utility's customers are not currently metered.*

***Maximum Day Demand** - Daily demand fluctuates throughout the year, due primarily to seasonal climate changes. Water demands are significantly higher in the summer than the winter. System production facilities must be sized to meet the demand on the maximum day of the year, not just the average. Water systems are sized to meet the greater of 1) the maximum day demands plus fire flow, or 2) peak hour demand. Fire flow and peak hour demand are not addressed in this UWMP.*

The average day and maximum day demands for years 1977 through 2004 are presented in Table 4-1. The maximum day demand in 2004 was 19,014 gpm, in comparison with the total well production capacity of 35,210 gpm. The ratio between average and maximum day demands provides a maximum day peaking factor that can be used to scale annual demand projections to maximum day levels. The average maximum day peaking factor from 1995 to 2004 is 1.91.

TABLE 4-1 MAXIMUM DAY DEMAND AND PEAKING FACTORS

	ANNUAL AVERAGE			MAXIMUM DAY		
YEAR	AFY	MGD	GPM	MGD	GPM	PEAKING FACTOR[b]
1977	10,578	9.44	6,556	19.28	13,389	2.04
1978	11,478	10.25	7,118	--[a]	--	--[a]
1979	12,349	11.02	7,653	22.50	15,625	2.04
1980	12,312	10.99	7,632	24.00	16,667	2.18
1981	12,487	11.15	7,743	22.34	15,514	2.00
1982	11,560	10.32	7,167	21.30	14,792	2.06
1983	11,539	10.30	7,153	21.67	15,049	2.10
1984	13,997	12.50	8,681	26.20	18,194	2.10
1985	14,814	13.22	9,181	--[a]	--	--[a]
1986	15,081	13.46	9,347	26.91	18,688	2.00
1987	15,305	13.66	9,486	27.00	18,750	1.98
1988	15,360	13.71	9,521	28.40	19,722	2.07
1989	14,654	13.08	9,083	28.50	19,792	2.18
1990	15,387	13.74	9,542	24.29	16,868	1.77
1991	13,313	11.88	8,250	21.55	14,965	1.81
1992	13,985	12.48	8,667	24.00	16,667	1.92
1993	14,013	12.51	8,688	24.10	16,736	1.93
1994	14,301	12.77	8,868	22.94	15,931	1.80
1995	14,390	12.85	8,924	24.64	17,111	1.92
1996	15,102	13.48	9,361	27.93	19,396	2.07
1997	16,330	14.58	10,125	28.68	19,917	1.97
1998	14,461	12.91	8,965	29.66	20,597	2.30
1999	16,587	14.81	10,285	28.32	19,667	1.91
2000	16,724	14.93	10,368	29.48	20,472	1.97
2001	17,108	15.27	10,606	30.10	20,903	1.97
2002	16,641	14.86	10,317	28.70	19,931	1.93
2003	16,185	14.45	10,034	26.68	18,530	1.85
2004	17,011	15.19	10,546	27.38	19,014	1.80
Average 1977 – 2004		**13.48**	**9,364**	**27.45**	**19,063**	**1.93**
Average 1995 – 2004		**14.94**	**10,374**	**28.62**	**19,873**	**1.91**

a. Data unavailable
b. Maximum day peaking factor = maximum day demand/annual average day demand

Source:City of Lodi Public Works Department

Unaccounted-for Water - *Unaccounted-for water use is unmetered water use, such as water use for fire protection and training, system and hydrant flushing, sewer cleaning, system leaks, and unauthorized connections. Unaccounted-for water can also result from meter inaccuracies. Since the City's system is not completely*

metered, data are unavailable for determining the percentage of unaccounted-for water. Unaccounted-for water is generally assumed to equal approximately 10 percent of total water production.

Unit Water Use - *Recent historical unit water use, expressed as gallons per capita per day (gpcd), is shown in Table 4-2. These unit demands include commercial usage, industrial usage, and unaccounted-for water.*

TABLE 4.2 RECENT HISTORICAL UNIT WATER USE

YEAR	POPULATION	UNIT WATER USE[a], GPCD
1999	56,926	260
2000	57,763	258
2001	58,600	261
2002	59,431	250
2003	60,521	239
2004	61,325	248

a. Based on total municipal water production provided by City of Lodi staff.

4.1.2 Future Water Demand

Future water demands are estimated based on 1) a constant 1.5% annual increase in the City's demand, 2) a constant 1.5 percent annual increase in the number of service connections, 3) the assumption that the City will install and begin reading water meters at a rate of approximately 950 per year, starting in 2006 or 2007, and 4) the assumption that as existing service connections become metered they will exhibit slightly lower unit demand factors than existing service connections without meters. It has been assumed that a residential service connection will exhibit a demand reduction of approximately 15%[1] once billing has commenced at commodity rates. Demands were projected based on actual water use in 2004. These projections are shown in Table 4-5 and illustrated in Figure 4-1. By 2030, average annual water demands[2] are expected to have increased from current demands by approximately 20%, from about 19,800 AFY (17.7 mgd) in 2005 to 23,800 AFY (21.2 mgd) in 2030. Demand projections by water use sector are presented in Table 4-3.

The projections in Table 4-5 represent normal (average) conditions, as actual use varies based on a number of factors. For this reason, it can be expected that there will be variations in the City's future water usage. The values predicted in these tables have been used in this UWMP, as they are assumed to represent average conditions of water demand.

[1] Based upon 1) information from the California Urban Water Council (CUWC, 2005) and 2) judgment from the City of Lodi staff

[2] Including 2,500 AFY currently being recycled in the vicinity of WSWPCF.

TABLE 4-3: PAST, CURRENT, AND PROJECTED WATER USE BY CUSTOMER CLASS (Guidebook Table 12)[a]

Year	Customer Class	Unmetered Connections[e]	Unmetered Deliveries[f,G], AFY	Metered Connections[e,H]	Metered Deliveries[c,F,G], AFY	Total Number of Connections	Total Municipal Deliveries[d], AFY
2001	SFR	15,410	10,071	0	0	15,410	10,071
	MFR	577	2,828	0	0	577	2,828
	Commercial/ Institutional	310	569	950	1,744	1,260	2,313
	Industrial	0	0	53	1,632	53	1,632
	Landscape	8	73	21	191	29	264
	TOTAL [b]	**16,300**	**13,500**	**1,000**	**3,600**	**17,300**	**17,100**
2005	SFR	16,537	9,955	0	0	16,537	9,955
	MFR	639	2,882	0	0	639	2,882
	Commercial/ Institutional	310	750	1,018	2,462	1,328	3,211
	Industrial	0	0	56	945	56	945
	Landscape	8	76	23	219	31	295
	TOTAL [b]	**17,500**	**13,700**	**1,100**	**3,600**	**18,600**	**17,300**
2010	SFR	13,205	7,949	4,610	2,775	17,815	10,725
	MFR	509	2,294	180	811	688	3,105
	Commercial/ Institutional	249	602	1,182	2,858	1,431	3,459
	Industrial	0	0	60	1,018	60	1,018
	Landscape	0	-2	34	320	33	318
	TOTAL [b]	**14,000**	**10,800**	**6,100**	**7,800**	**20,000**	**18,600**
2015	SFR	8,730	5,255	10,462	6,298	19,192	11,554
	MFR	334	1,504	408	1,840	742	3,345
	Commercial/ Institutional	159	384	1,382	3,343	1,541	3,727
	Industrial	0	0	65	1,094	65	1,094
	Landscape	0	0	36	345	36	345
	TOTAL [b]	**9,200**	**7,100**	**12,400**	**12,900**	**21,600**	**20,100**
2020	SFR	4,255	2,561	16,420	9,885	20,675	12,446
	MFR	158	715	640	2,888	799	3,603
	Commercial/ Institutional	69	167	1,591	3,848	1,660	4,015
	Industrial	0	0	70	1,178	70	1,178
	Landscape	0	0	39	372	39	372
	TOTAL [b]	**4,500**	**3,400**	**18,800**	**18,200**	**23,200**	**21,600**

Continued on next page

Year	Customer Class	Unmetered Connections[e]	Unmetered Deliveries[f,G], AFY	Metered Connections[e,H]	Metered Deliveries[c,F,G], AFY	Total Number of Connections	Total Municipal Deliveries[d], AFY
2025	SFR	0	0	22,273	13,409	22,273	13,409
	MFR	0	0	861	3,884	861	3,884
	Commercial/ Institutional	0	0	1,788	4,324	1,789	4,324
	Industrial	0	0	75	1,269	75	1,269
	Landscape	0	0	42	401	42	401
	TOTAL [b]	**0**	**0**	**25,000**	**23,300**	**25,000**	**23,300**
2030	SFR	0	0	23,994	14,445	23,994	14,445
	MFR	0	0	927	4,181	927	4,181
	Commercial/ Institutional	0	0	1,927	4,659	1,927	4,659
	Industrial	0	0	81	1,371	81	1,371
	Landscape	0	0	45	428	45	428
	TOTAL [b]	**0**	**0**	**27,000**	**25,100**	**27,000**	**25,100**

a. The term "Guidebook X" refers to the table in the Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan by DWR.
b. Rounded to the nearest hundred.
c. Does not reflect demand reductions as a result of meter implementation. Refer to Table 4-5 for water savings as a result of meter implementation.
d. Does not include 2,500 AFY currently being recycled in the vicinity of WSWPCF.
e. Assumes 10 dwelling units per MFR connection.
f. Assumes 75% of total water deliveries go to SFR and MFR connections. This assumption is based on recent water usage statistics for the City, and is consistent with historical per capita water usage.
g. Assumes that the per-dwelling-unit demand factor for MFR connections is 75% of the unit demand factor for SFR connections.
h. Assumes that approximately 950 existing connections are retrofitted with meters every year between 2006 and 2025. The actual rate at which meters are installed/retrofitted may be greater.

4.2 Sales to Other Agencies

At the present time, the City does not foresee any opportunities for sales to other agencies.

4.3 Other Demands

Other water uses and losses in the City's service area are presented in Table 4-4 below. The 2,500 AFY shown for recycled water includes the amount of water currently used to irrigate land in the vicinity of WSWPCF. Although the land is irrigated with non-potable secondary treated wastewater, the 2,500 AFY must be subtracted from the total amount of wastewater available to the City for reclamation and reuse in municipal applications. For the purposes of this UWMP, therefore, the 2,500 AFY is considered a demand.

TABLE 4-4 ADDITIONAL WATER USES AND LOSSES (GUIDEBOOK TABLE 14)

WATER USE	2000	2005	2010	2015	2020	2025	2030
Recycled Water[a]	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Unaccounted-for System Losses[b]	1,672	1,727	1,774	1,801	1,837	1,883	2,029
TOTAL	**4,172**	**4,227**	**4,274**	**4,301**	**4,337**	**4,383**	**4,529**

a. Reflects the amount of recycled water currently recycled in the vicinity of WSWPCF. Does not include 1 mgd promised by the City in a "will serve" letter to Northern California Power Agency, as the power plant that would utilize this water is only potential at this time.
b. Unaccounted-for system losses are generally assumed to be approximately 10 percent of total water production. Because water usage is measured at the City's wells, unaccounted-for water is "accounted for" in the City's total demand projections in Table 4-5 (i.e., it should not be added to the demands in Table 4-5).

4.4 Total Demands

The City's total average annual demands are presented in Table 4-5 and Figure 4-1. For the purposes of this UWMP, only the projected future demands with conservation are considered in subsequent analyses. It should be noted that while Table 4-3 includes projections for municipal demands only, Table 4-5 includes a demand of 2,500 AFY for non-municipal recycling (refer to previous section).

TABLE 4-5 TOTAL DEMANDS (GUIDEBOOK TABLE 15)

YEAR		2005	2010	2015	2020	2025	2030
Demand AFY	Without Conservation[a]	19,800	21,100	22,500	24,100	25,800	27,600
	With Conservation[ab]	19,800	20,400	20,900	21,600	22,300	23,800

a. Includes 2,500 AFY of recycled water currently recycled in the vicinity of WSWPCF. Table 4-3 includes municipal demands only, and therefore does not match this table.
b. Assumes a 15 percent reduction in demand for metered residential service connections.

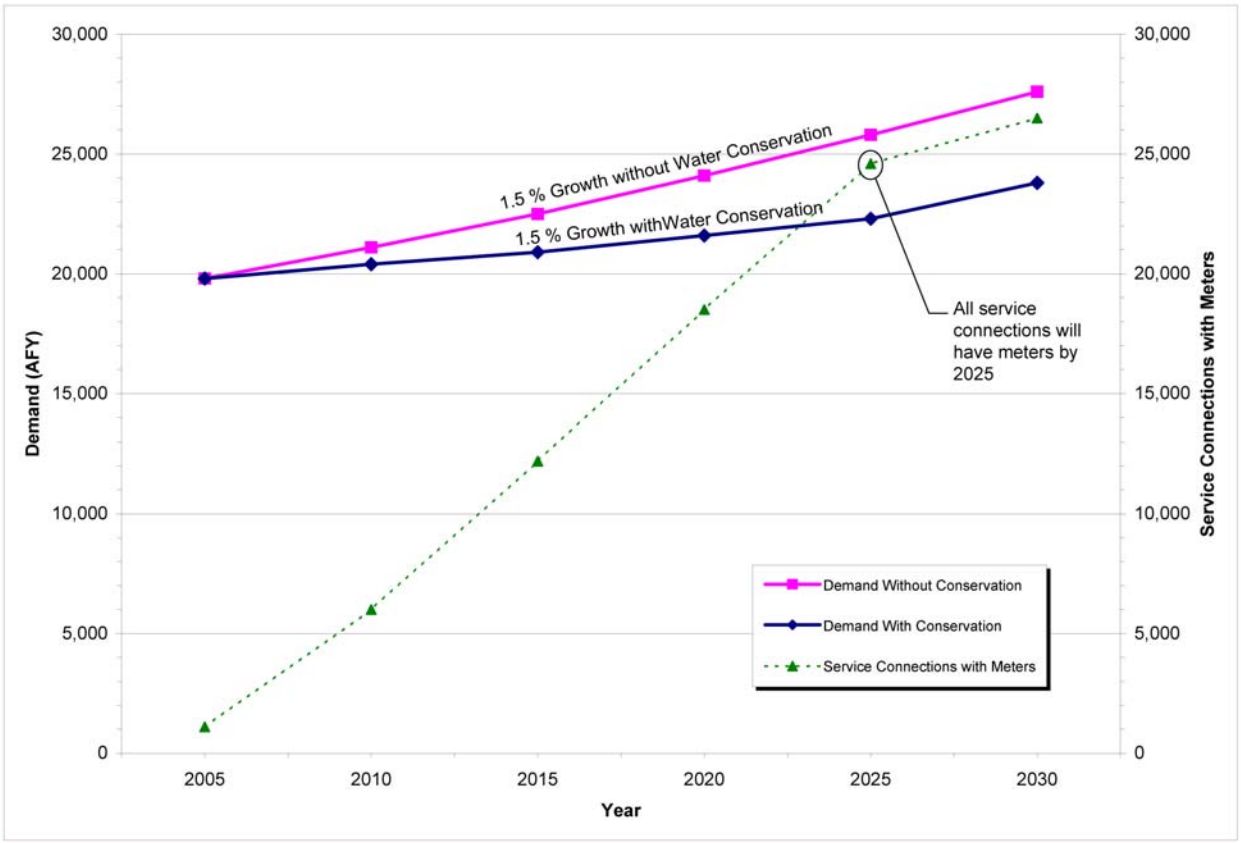


FIGURE 4-1. PROJECTED WATER DEMAND

STEP 4 - DOCUMENTING DRY YEARS SUPPLY

EXCERPTED from the 2005 UWMP to provide the data outlined in Step 4 of the Guidelines for Implementation of SB 610 are pages 6-1 to 6-4 with sections entitled:

Chapter 6 Water Supply Reliability

6.1 Climate
- 6.1.1 Reliability and Vulnerability of Water Supply to Seasonal or Climatic Changes

6.2 Projected Normal Water Year Supply
6.3 Projected Single Dry Year Supply
6.4 Projected Multiple Dry Year Supply
- 6.4.1 Minimum Supply Volumes for Next Three Years
- 6.4.2 Basis for Normal, Single Dry and Multiple Dry Year Water Data

6.5 Supply Inconsistencies

The Excerpts noted above are as follows:

CHAPTER 6. WATER SUPPLY RELIABILITY

This section provides a description of the potential variability in the City's water supplies caused by environmental, legal, and climatic factors, as well as the steps being taken by the City to address these potential concerns.

6.1 Climate

In California, climate can significantly affect the reliability of water supplies in certain regions. This section analyzes the vulnerability of the City's water supplies to climatic effects.

6.1.1 Reliability and Vulnerability of Water Supply to Seasonal or Climatic Changes

***Groundwater** - Although the City's groundwater basin is replenished in part by the Mokelumne River, the annual quantity of groundwater available does not vary significantly due to seasonal or climatic changes. Additionally, seasonal or climatic changes are not expected to impair the City's ability to extract groundwater, as seven of the City's wells are equipped with emergency generators.*

***Surface Water** - The reliability of the City's surface water supply may be affected by drought. The City's contract for surface water delivery from WID, which diverts water from the Mokelumne River, is subject to curtailments of up to fifty percent during dry years. WID is required by the contract to annually provide the City, on or about May 1, with a preliminary estimate of whether or not the City's deliveries will be curtailed in a given year. Final estimates of any curtailment in a given year must be provided to the City on or about July 1.*

***Recycled Water** - The amount of recycled water available to the City comes primarily from indoor water use within the City's limits and is not expected to fluctuate significantly due to seasonal or climatic changes.*

6.2 Projected Normal Water Year Supply

During normal water years, no curtailments or other reductions in supply are expected for any of the City's supplies. The projected normal water year supplies from 2010 to 2030 are shown in Table 6-1.

TABLE 6-1 WATER SUPPLY RELIABILITY (GUIDEBOOK TABLE 8)[a]

WATER YEAR TYPE	SUPPLY TYPE	2010	2015	2020	2025	2030
Normal	Groundwater, AFY	15,000	15,000	15,000	15,000	15,000
	Surface Water, AFY	6,000	6,000	6,000	6,000	6,000
	Recycled Water[b], AFY	7,700	8,300	8,940	9,630	10,380
	TOTAL[c], AFY	**28,700**	**29,300**	**29,900**	**30,600**	**31,400**

a. The term "Guidebook X" refers to the table in the Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan by DWR.
b. Extrapolated from the amount of wastewater treated in 2004. Assumes that the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to the nearest hundred

6.3 Projected Single Dry Year Supply

During single dry water years, there may be up to a 10.5% reduction[3] in the City's normal combined water supplies, reflecting a 50% curtailment in the City's surface water supply by WID. No reductions are assumed for the City's recycled water or groundwater supplies. The projected single dry water year supplies from 2010 to 2030 are shown in Table 6-2.

3 Assuming that the amount of available recycled water increased over time, the maximum percent reduction projected will decrease from 10.5% in 2010 to 9.6% in 2030.

6.4 Projected Multiple Dry Year Supply

Because the City's surface water supply is the only supply that is considered to be susceptible to dry water years, and because 50% is the maximum annual curtailment allowed under the City's contract with WID, supplies available during multiple dry water years are assumed to be no different than supplies available during single dry water years. The projected multiple dry water year supplies from 2010 to 2030 are shown in Table 6-2.

TABLE 6-2 SINGLE DRY AND MULTIPLE DRY WATER YEAR SUPPLY PROJECTIONS

WATER YEAR TYPE	SUPPLY TYPE	2010	2015	2020	2025	2030
Single Dry	Groundwater, AFY	15,000	15,000	15,000	15,000	15,000
	Surface Water, AFY	3,000	3,000	3,000	3,000	3,000
	Recycled Water[b], AFY	7,700	8,300	8,940	9,630	10,380
	TOTAL[c], AFY	**25,700**	**26,300**	**26,900**	**27,600**	**28,400**
Multiple Dry	Groundwater, AFY	15000	15000	15000	15000	15000
	Surface Water, AFY	3000	3000	3000	3000	3000
	Recycled Water[b], AFY	7700	8300	8940	9630	10380
	TOTAL[c], AFY	**25700**	**26300**	**26900**	**27600**	**28400**
Summary	Single Dry Water Year, AFY	25700	26300	26940	27630	28380
	Percent of Normal	**90%**	**90%**	**90%**	**90%**	**90%**
	Multiple Dry Water Year(s), AFY	25700	26300	26940	27630	28380
	Percent of Normal	**90%**	**90%**	**90%**	**90%**	**90%**

b. Extrapolated from the amount of wastewater treated in 2004. Assumes that the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to the nearest hundred

The future supply volumes presented in Sections 6.2 to 6.4 represent the water to which the City has the legal rights to use. This should not be confused with water that can readily be distributed to the Utility's customers, as additional infrastructure must be constructed before the total volumes presented in the tables above can be distributed to the City. In order to provide the City with surface water, for example, intake facilities, a surface water treatment plant, and additional distribution pipeline could be required.

6.4.1 Minimum Supply Volumes for the Next Three Years

Under agreements with the East Bay Municipal Utilities District (EBMUD), WID obtains water stored in Pardee and Comanche reservoirs. Since both of these reservoirs are currently full, supply volumes for the City of Lodi for the next three years are expected to be "normal." However, the minimum supply volumes for 2006 through 2008, or the supplies available if the City's contract with WID faced maximum curtailments, are presented in Table 6-3.

TABLE 6-3 MINIMUM SUPPLY VOLUMES FOR 2006-2008 (GUIDEBOOK TABLE 24)

SUPPLY TYPE	2006	2007	2008
Groundwater, AFY	15,000	15,000	15,000
Surface Water, AFY	3,000	3,000	3,000
Recycled Water, AFY	7,200	7,300	7,400
TOTAL, AFY	**25,200**	**25,300**	**25,400**

a. Reflects the total amount of wastewater available to the City for reclamation and reuse

6.4.2 Basis for Normal, Single Dry, and Multiple Dry Year Water Data

The data presented in Sections 6.2 through 6.4 were developed based on 1) the assumptions that the City's groundwater and recycled water supplies are not susceptible to short term drought conditions, and 2) the City's contract with WID. Since the City's contract with WID is relatively new, there have been no historical curtailments in the City's surface water supply upon which to base future dry water year projections. Hence, the maximum allowable curtailment has been assumed for these circumstances. The base year for all water year data is 2005.

TABLE 6-4 BASIS OF WATER YEAR DATA (GUIDEBOOK TABLE 9)

WATER YEAR TYPE	BASE YEAR
Normal	2005
Single Dry	2005
Multiple Dry	2005

6.5 Supply Inconsistencies

Water supply from the City's only wholesale supplier, WID, is susceptible primarily to drought conditions, when diversions from the Mokelumne River may be reduced by WID. Due to the infancy of this contract, there are no historical reductions upon which to base assumptions. Even in the most severe drought conditions, however, WID may only reduce the City's supply by 50 percent. Supply reliability projections for this source are presented in Table 3-7.

Water supply from the City's groundwater wells is considered to be very consistent. Historical fluctuations in groundwater levels due to changes in climatic conditions have been minor, and have not significantly impacted well production capacity. Additionally, six of the City's wells are equipped with granular activated carbon (GAC), and provide added insurance against inconsistencies caused by the presence of contaminants in the City's aquifer. Finally, the availability of seven emergency generators at various well locations ensures the City's ability to extract groundwater during extended power outages.

As discussed previously, the groundwater basin underlying the City is in overdraft, and groundwater levels are decreasing by approximately 0.39 ft/yr. From an extraction standpoint, however, this is a relatively slow process, and the City does not anticipate that overdrafting conditions will significantly impact its ability to extract groundwater in the short term. However, the City remains committed to eliminating the overdraft condition in the long term and has been an active participant in actions to accomplish this task. As a member of GBA, the City has participated in the development of regional groundwater recharge and conjunctive use programs intended to replenish Eastern San Joaquin County's groundwater basin and promote sustainability for the future. A copy of the GBA Groundwater Management Plan is included in Appendix F.

Recycled water supply for the City is considered to be very consistent. Indoor water consumption by the City's customers, which does not significantly fluctuate with climatic conditions like outdoor water use, is the source of the City's recycled water supply. As such, the amount of recycled water available to the City is not expected to fluctuate in the future; indeed, as the number of water and sewer connections increase, so too will the City's recycled water supply.

As a result of the relative consistency of the City's water supplies, there are no plans at this time to replace any of the City's supply sources with alternative sources. The City is part of a group of Eastern San Joaquin County water users negotiating a conjunctive use project with EBMUD. Recently, however, negotiations surrounding this project have stagnated. Although this project bears the possibility of increasing the City's future water supplies, for the purposes of this UWMP this potential supply is not reflected in Table 3-5.

CHAPTER 5: STEPS 3 AND 4 - DOCUMENTING DEMAND EFFECTS OF THE PROJECT

Background

From City records, the total water deliveries in 2004 were 17,011 AFY or 15.18 MGD and the population for the City was 61,325. The annual population growth rate has been estimated at 1.5% from 2004 to 2030. Also in 2004, water use per capita was 248 gpcd in comparison to 285 gpcd estimated in 1987. This is a citywide average that includes commercial, industrial, and public water use.

The Reynolds Ranch Project area currently consists of 220 acres of agricultural land and residences. The existing water source for the land within the Project area is primarily groundwater wells. The State of California has estimated that the regional average on-farm unit applied water use for irrigation in the San Joaquin region is 3.2 acre feet per acre.[1] The current agricultural irrigation practice within the project area is either fallow or a drip system, so actual water use is significantly less than the county average.

[1]*California Department of Water Resources, California Water Plan Update 2005 Volume 3 – Regional Reports, Chapter 7, San Joaquin River Hydrologic Region at pp. 7-14*

Water Supply Considerations

The City has accepted 15,000 AFY as the demand that the groundwater basin can accept without experiencing significant draw down, based upon the City's current land area.

The 2005 UWMP states that as water meters are installed, it is expected that water use by those customers will decline and, by completion of the meter installation program, water use will decrease by about 15%. In addition, other conservation methods are being pursued by the City. For planning purposes, the reduction in annual demand of the existing customers will be approximately 2500 AFY by 2030.

Table 5-1 shows the projected demand in five-year increments, 2005 to 2030.

TABLE 5-1 DEMAND PROJECTIONS[a]

YEAR	DEMAND (AFY)
2005	17,300
2010	18,600
2015	20,100
2020	21,600
2025	23,300
2030	25,100

a. Refer to Table 4-3 of UWMP

City records provide a Vacant Land Inventory based on the City's General Plan shown in Figure 2 on page 4. The Vacant Land Inventory indicates 1033.82 acres are vacant and that 3,237 dwelling units could be developed. The Vacant Land inventory includes the Westside/Southwest Gateway area. Using the general plan population factors, development of the Vacant Land would result in a population growth of about 8,154 persons. The required Water supply to serve the development of the Vacant Land would amount to 2265 AFY. This estimate does not include the Planned Residential Reserve Area of the General Plan. The water supply required to serve the Vacant Land is part of the projected water demand presented in UWMP Figure 4-1.

The City has accepted that 15,000 AFY is the safe yield the groundwater basin can provide without experiencing significant drawdown of the water table, based upon the City's current developed land area. The Reynold's Ranch Project will expand the size of the City, increasing its ability to draw on the basin as agricultural uses are disbanded within the incorporated City limits, the safe yield would increase by 374 acre-feet per year.

Increase safe yield = project area * safe yield factor
= 220 acres * 1.7
= 374 acre-feet per year

The City has determined that the relationship of the area of the City to the safe yield be estimated at 1.70 acre-feet per acre. The average per acre relationship of the safe yield has been calculated to be approximately 1.95 acre-feet per acre per year. This calculation assumes the safe yield is uniform throughout the City. In practice, yields may vary throughout a region. For example, the groundwater safe yield in the Stockton area is 0.75 acre feet per acre per year which is 60% lower than the estimate for Lodi of 1.95 acre feet per acre per year. As the City of Lodi expands in land area, it is probable that the City's average safe yield will change. Therefore, for purposes of this WSA, the safe yield has been reduced for the newly annexed areas to 1.7 acre-feet per acre per year. Therefore, with annexation of the Reynold's Ranch project, the City of Lodi's safe yield of the groundwater basin will increase to 15,374 AFY. Even though the current City needs exceed this amount, the basin has not yet demonstrated significant degradation and is still able to meet the City's needs in the short term. Regardless, the proposed project would contribute to this overdraft.

With the firm supply of 21,000 AFY (15,000 AFY + 6,000 AFY) shown in the 2005 UWMP plus an additional 374 AFY from the expansion of the City, the following Table 5-2 illustrates the projected water supply for the City with the project. Note, the vacant land demand includes the Westside/SW Gateway project.

TABLE 5-2 WATER BALANCE CALCULATION (ALL NUMBERS ARE IN AFY)

Existing Water Demand	17,011
Less Metered Reduction of 15% (per UWMP)	(2,500)
Reynold's Ranch Water Demand*	501
Vacant Land Water Demand	2,265
TOTAL WATER DEMAND	**17,277**
Available Groundwater Supply (with annexation)	15,374
Available Surface Water Supply	6,000
TOTAL WATER SUPPLY	**21,374**
Available Reserve**	4,097

* See Table 5-3 for details
** Total Water Supply less Total Water Demand

The ongoing water metering program and implementation of a surface supply by the City will provide sufficient water to meet the projected needs of the City.

Table 5-2 above outlines the water balance for the City based on current use by existing development, projected demand by development of existing vacant land within the City and the additional demand generated by the development of the Project.

If development of vacant land is considered to occur over the planning period, the water demand resulting from development of the vacant land would be included in the overall demand calculations as presented in Table 5-2 and, therefore, demand would catch up to the supply by after 2019. The City would need to plan to provide additional firm water supplies to serve growth beyond 2019.

Other Water Supply Considerations

The above scenarios are based on a static available supply, which is not practical for two reasons. First, as noted in the 2005 UWMP, the City is already considering obtaining additional surface water supplies from Woodbridge Irrigation District. The City also retained Schlumberger Water Services to prepare a "Surface Water Supply Options" study in 2004 to determine how best to utilize the newly acquired surface water. Second, the calculation of safe yield for groundwater extraction of 15, 000 AFY, contained in the Urban Water Management Plan and accepted by the City, was based upon Lodi's current usage less its proportion (based upon area) of the overall basin overdraft. Therefore, as the City's land area increases through annexations, the estimated safe yield of the aquifer will also increase. The City has determined that the per-acre relationship of the safe yield should be estimated at a conservative 1.70 acre-feet per acre.

The current contract with WID for 6,000 AFY also provides for carry over or banking of water not taken over the first seven years of the agreement not to exceed 18,000 acre feet. The City may take delivery of the banked water over the forty-year term of the agreement. The agreement also provides for later delivery of water if delivery is curtailed by dry years. The WID reports that in the past 16 years, their entitlement has only been curtailed in two years (back-to-back). (Anders Christensen, WID General Manager to Lodi City Council, June 21, 2006) The City's contract provides that curtailment amounts are "banked" on paper and are to be made up in wetter years. Thus, the impact of short-term increases in groundwater pumping will be mitigated. When the WID surface water supplies and banked water are added to the groundwater supplies, water supplies will be available for the projected planning period of 2005 to 2030 and beyond.

The improvements to implement the use of the surface water are included in the City's planning as well as consideration of other appropriations discussed in the Schlumberger report. While all routes to obtain new water sources need to be studied, they are not relevant to this Water Supply Assessment as the Contract with WID provides a firm water supply that the City has committed to utilize and will be available to provide supplemental water to meet project and other future demands through 2030.

The City has developed a comprehensive approach to address the groundwater overdraft problem; the City's 2005 Urban Water Management Plan identifies the following five strategies that are being implemented to resolve this shortcoming:

1. **Establishment of a Water Conversation Program**—The City has already established a Water Conservation Ordinance and a Water Conservation Rebate program that has shown reductions in demand. Continued implementations of these programs will reduce the current overdraft condition and will eventually develop surplus capacity that could be used to meet the needs of the project.
2. **Establishment of a Recycle Water System**—The City has developed a water reuse program and is treating water for reuse at the Wastewater treatment plant. Currently, this water is being distributed to area farmers, thereby reducing their groundwater and surface water demands and improving the overall regional water balance. Expansion of this program is being planned and the incorporation of recycled water for landscape areas and other acceptable uses will further reduce demand on the groundwater basin.
3. **Development of Groundwater Recharge Systems**—The City is looking into groundwater recharge systems. Such systems are not currently considered for the Reynolds Ranch project, although other developments around the City are including such systems to provide additional groundwater recharging, improving the city's water balance.
4. **Development of Surface Water Treatment**—The City has acquired an additional 6,000 AF of water rights from the Woodbridge Irrigation District. The City is

considering developing a water treatment plant to provide additional supply for the City consumers. This surface water could also be used as groundwater recharge supply as an alternative as outlined above.

5. **Development of Additional Water Wells**-- Wells provide an efficient means of providing for peak day and peak hour water demands by providing a distributed water source system. Adding additional wells does not necessarily increase ground water usage, especially if those wells are used primarily to meet peak day, peak hour or emergency water demands. Alternately, implementation of additional storage may reduce the need for more peak wells.

Phase I of the proposed project is anticipated to be developed before 2010, which is when the 6,000 AFY of purchased water from WID is expected to be available for use. As such, prior to 2010 Phase I would rely on the groundwater basin for water supply. As described above, Phase I of the proposed project is projected to use 88 AFY of water per year, and the entire Reynolds Ranch Project is anticipated to require about 501 AFY of water annually.

Water conservation and water meter retrofit programs have been implemented by the City to reduce water demands within the community. These programs will continue and expand in the future. Recycled water use has been implemented at White Slough Water Pollution Control Facility to reduce agricultural demands on the groundwater basin. Expanded recycled water use programs are under study and will be implemented in the future. As presented in Table 5-2, the long-term water demands for the community will be served by a conjunctive supply program including groundwater, surface and conservation.

After 2010, full utilization of the water purchased from WID will reduce the City's draw on the groundwater basin to within safe yield levels, including the project's ultimate annual demand of 501 AFY.

Effect of the Reynolds Ranch Project

Based upon the planned land uses for the Reynolds Ranch Project shown in Table 1, on page 1, the estimated project demand was calculated using Standard demand rates as outlined in the Water Distribution Systems Handbook, by Larry W. Mays, McGraw-Hill 2000. Expected demand increase for the project has been calculated as 501 acre-feet per year. See Table 5-3.

TABLE 5-3 ESTIMATED WATER DEMAND – REYNOLD'S RANCH PROJECT

LAND USE TYPE	LAND USE AREA (ACRES)	DEMAND FACTOR (GALLONS PER DAY PER ACRE)	AVERAGE DAILY DEMAND (GALLONS PER DAY)
Commercial			
Mini Storage	5.3	2040	10,812
Commercial	40.5	2040	82,620
Subtotal	**45.8**		**93,432**
Office			
Office	20.1	2030	40,803
Subtotal	**20.1**		**40,803**
Residential			
LDR	20.6	1670	34,402
MDR	63.9	2610	166,779
HDR	12.1	4160	50,336
Subtotal	**96.6**		**251,517**
Parks/Open Space			
Detention Basin	8	2,020	16,160
Neighborhood Park	5.4	2,020	10,908
Open Space	7.3	0	0
Interchange	4.5	2,020	9,090
Subtotal	**25.2**		**36,158**
Public Facility			
Fire Station	1	1,700	1,700
Subtotal	**1**		**1,700**
Public Facility			
School (B-9)	14	1,700	23,800
Subtotal	**14**		**23,800**
Public Facility			
Roadway Row	17.3	0	0
Subtotal	**17.3**	**0**	**0**
TOTAL	**220**		**447,410**
		ESTIMATED TOTAL	**501 AFY**

The Reynolds Ranch Project would have little effect on the City's water supply system. As shown above, based on the proposed land uses for the Project that includes commercial uses, the estimated Project demand would be an increase of 3% of the current water deliveries.

The safe yield for groundwater extraction outlined in the Urban Water Management Plan and accepted by the City is 15,000 AFY. Adding the Reynolds Ranch Project annexation and using a ratio of 1.70 as determined by the City may ultimately increase the safe yield to 15,374 AFY but the designated water supply for the project is surface water purchased from WID. Reynolds Ranch Project water demand will initially begin at zero and gradually increase to 501 AFY as the project is developed. The phased increase in demand will allow for the City to implement a program to use the surface water.

CONCLUSION AND RECOMMENDATIONS

- The current water supply of the City of Lodi is consistent, reliable, and meets all EPA quality requirements. The quantity is adequate for the projected growth as presented in the 2005 UWMP.
- Water supplies are available to serve the Reynolds Ranch Project in accordance with the requirements included in SB 610. The total available supply of 21,374 AFY exceeds the projected demand of 17,277 AFY.
- The Reynolds Ranch project will utilize ground water for interim supply by continuing to install wells to meet project demands. Long term, Reynolds Ranch water demands will be met using surface water purchased from WID.
- Surface water is available under the WID contract and will be developed independently by the City on the City's schedule.
- The City should continue the program to install water meters and to encourage water conservation.
- The City should pursue expansion of the recycled water program to include landscape areas, parks, and other acceptable uses.

At the time of preparation of this analysis, the City of Lodi is considering two annexations, the Reynold's Ranch project and the Westside/Southwest Gateway project. These projects are independent and will be considered for approval separately. Increasing the area of the City with the addition of both project areas also increases the City's proportion of the safe yield to 16,069 AFY.

If both projects are approved and using the information developed in the Reynold's Ranch and Westside/SW Gateway Water Supply Assessment, the water balance calculation would read as shown in Table 5-4 on the following page.

TABLE 5-4 WATER BALANCE CALCULATION (ALL NUMBERS ARE IN AFY)

Existing Water Demand	17,011
Less Metered Reduction of 15% (per UWMP)	(2,500)
Reynold's Ranch Water Demand**	501
Vacant Land Water Demand	1,378
Westside/SW Gateway Water Demand*	887
TOTAL WATER DEMAND	**17,277**
Available Groundwater Supply (with annexation)	15,000
Reynold's Ranch	374
Westside/SW Gateway	695
Available Surface Water Supply	6,000
TOTAL WATER SUPPLY	**22,069**
Available Reserve***	4,792

* See Westside/SW Gateway project WSA Table 5-3 for details
** See Table 5-3, for details.
*** Total Water Supply less Total Water Demand

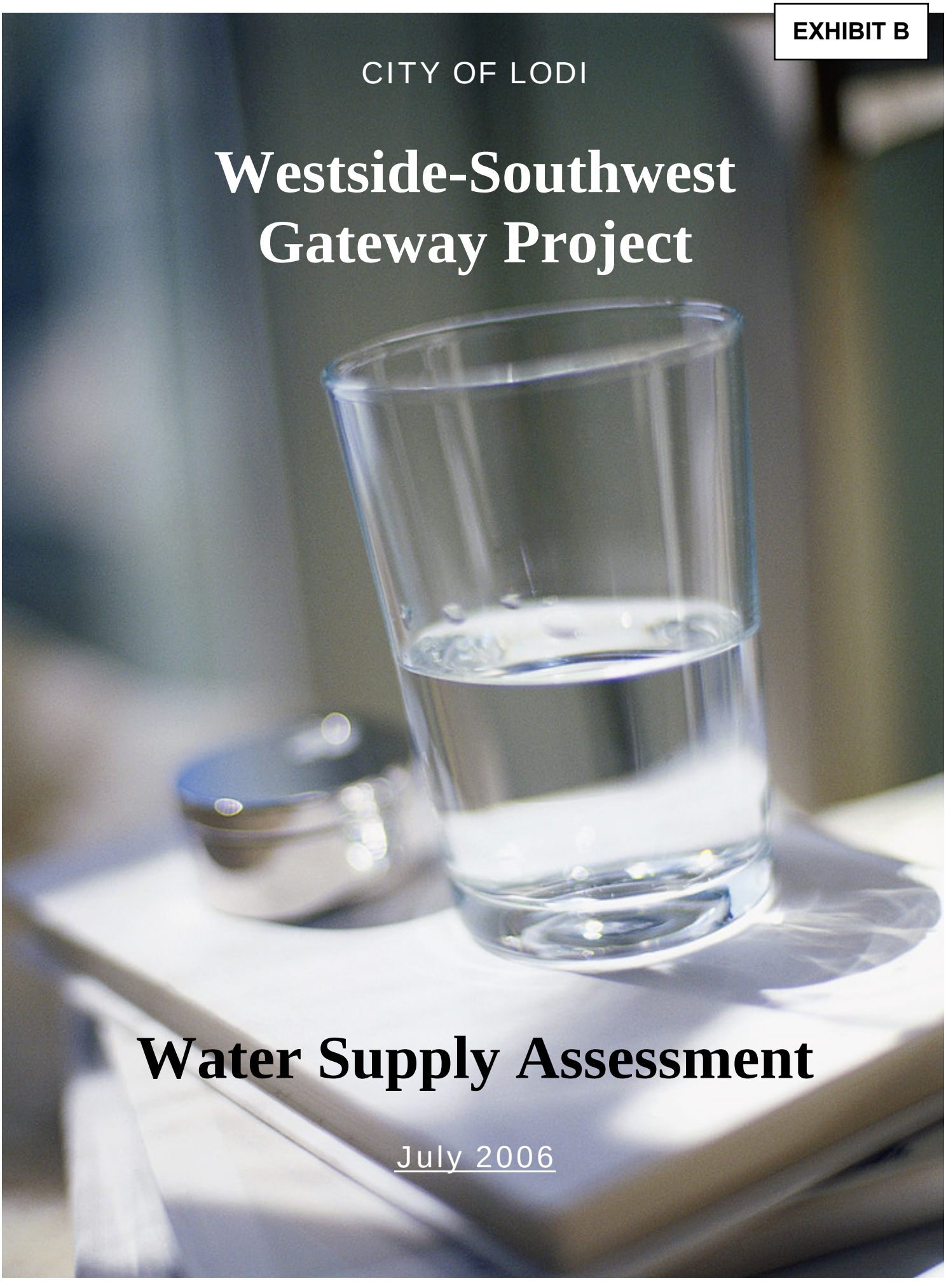
With the Reynold's Ranch and Westside/SW Gateway projects, the water supply for single and multiple dry year conditions will exceed the projected demand.

Based upon the above analysis, the cumulative effect of the addition of both projects does not alter the conclusions and recommendations for each project.

EXHIBIT B

CITY OF LODI

Westside-Southwest Gateway Project



Water Supply Assessment

July 2006

INTRODUCTION

This Water Supply Assessment (WSA) is prepared in compliance with Senate Bill 610, effective January 1, 2002, for two developments proposed by Frontiers Community Builders. Each of the proposed developments meet the criteria defined in California Water Code, Section 10912, to be classified as a "Project" and are combined in this WSA as follows:

1. The Project proposes the development of two residential developments known as Lodi–Westside with 740 dwelling units, and Lodi-Southwest Gateway with 1,350 dwelling units for a total of 2,090 dwelling units.

A Notice of Preparation (NOP) as defined in CEQA was filed for both developments with the lead agency, City of Lodi, on September 16, 2005. Conceptual land use plans for the two developments, Lodi-Westside and Lodi-Southwest Gateway, hereinafter referred to as Westside/SW Gateway, are shown on Figures 1 and 2, respectively.

The proposed Project of Frontiers Community Builders consists of 409.5 acres of existing agricultural and residential use land to be developed into residential, public facility and open space uses as shown in Table 1.

TABLE 1 **WESTSIDE PROJECT PLANNED LAND USES**

LAND USE	LODI-WESTSIDE	
	ACREAGE	DWELLING UNITS
Residential	110.0	740
Retail/Commercial	0.0	0
Office	0.0	0
Public Facilities	15.3	0
Parks/Basins	20.0	0
Road ROW	6.44	0
TOTALS	**151.74**	**740**

SW GATEWAY PROJECT PLANNED LAND USES

LAND USE	LODI-SOUTHWEST	
	ACREAGE	DWELLING UNITS
Residential	200.0	1,350
Retail/Commercial	0.0	0
Office	0.0	0
Public Facilities	15.0	0
Parks/Basins	30.0	0
Road ROW	12.76	0
TOTALS	**257.76**	**1,350**

The total number of dwelling units for the Westside/SW Gateway Project would be 2,090, which results in an estimated population growth of 4,807.

The intended land uses satisfy the criteria of a Project and the need for a WSA. This WSA format follows the format in the "Draft Guidebook for Implementation of SB 610 & SB 221 of 2001" prepared by the California DWR.

The Guidebook for Implementation of SB-610 and SB-221 outlined the following Sections/Steps to be addressed in Water Supply Assessments:

Section 1	Does SB-610 or SB-221 apply?	
Section 2	Who will prepare the SB- 610 assessment?	
Section 3	Has an assessment already been prepared that includes this project?	
Section 4	Is there a current Urban Water Management Plan?	
Section 5	What information should be included in an assessment?	
	Step One:	Documenting wholesale water supplies.
	Step Two:	Documenting supply
		If groundwater is a source
		If assessment relies on sources never before used
	Step Three:	Documenting project demand
		Detailing existing and planned future uses
	Step Four:	Documenting dry year(s) supply for water suppliers with multiple sources
	Step Five:	Documenting dry-year(s) demand
Section 6	Is the projected water supply sufficient or insufficient for the proposed project?	
Section 7	NOT INCLUDED BECAUSE SUPPLY CONSIDERED SUFFICIENT	
Section 8	Final action by lead agency. Conclusions included	

Note—In this report, SB-221 does not apply since a subdivision map has not been submitted.

FIGURE 1
LODI GENERAL PLAN
WATER SUPPLY ASSESSMENT

FIGURE 2
LODI GENERAL PLAN
WATER SUPPLY ASSESSMENT

SB 610 - SECTIONS 1 THROUGH 4: SUPPLY ASSESSMENT PROCESS

(Sections 1 through 4 determine preparation of a WSA)

- The Project is subject to SB-610 because it proposes the development of 2,090 dwelling units.
- The Project is not subject to SB-221 because a subdivision map has not been submitted to the City.
- The City is the "water supplier" for the Project.
- The Project has not been the subject of a WSA.
- The City adopted an Urban Water Management Plan (UWMP) in 1990 and updated the Plan in 1995 and in 2005.

The Project is in the initial planning stages and no subdivision maps have been prepared for the property. Therefore, the Project is not subject to SB-221.

The City of Lodi provides water service to the existing developed area. The Project is not within the city limits but both developments are contiguous to the city limit on the west side so that the distance for any extension of service would be short. Although currently outside the city limits, the project area is within the City's sphere of influence, has been considered in the City's planning and is included within the recently adopted Urban Water Management Plan. In Figure 3, the City General Plan and Sphere of Influence boundaries are shown along with the boundary of the Westside/SW Gateway and Reynold's Ranch projects.

This WSA addresses the California Water Code pertaining to the preparation of WSAs and is strictly an assessment of the City's ability to provide water service to the Project. This WSA does not constitute an agreement to serve water to the Lodi-Westside or the Lodi-Southwest Gateway projects.

As noted above, the City adopted an Urban Water Management Plan in 1990 and updated the plan in 1995 and in 2005. Much of the information included herein was presented in the 2005 UWMP and is referenced or excerpted throughout this report.

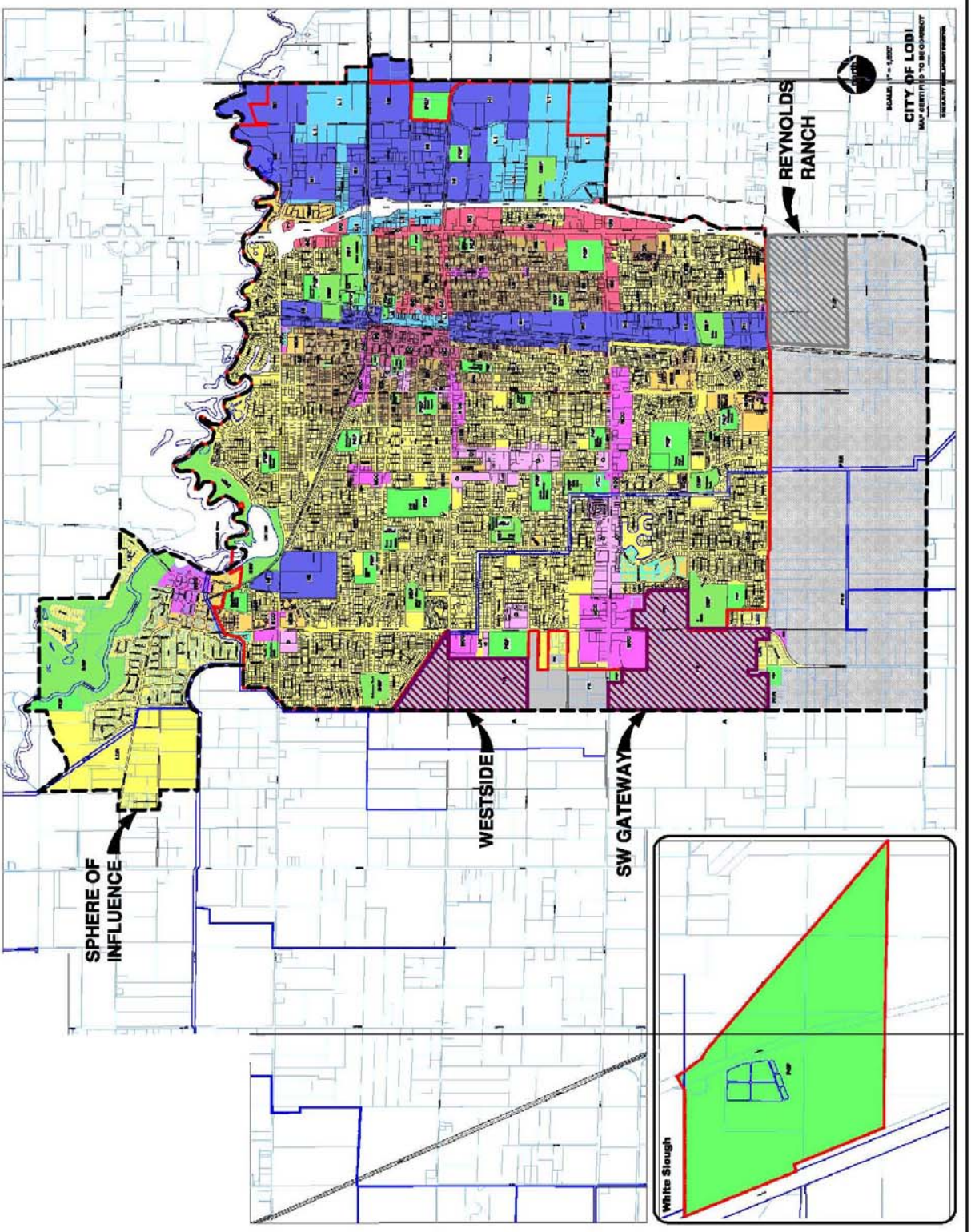


FIGURE 3
LODI GENERAL PLAN & SPHERE OF INFLUENCE
WATER SUPPLY ASSESSMENT

SECTION 5: SUPPLY AND DEMAND DOCUMENTATION

A. WATER SUPPLIES

The City adopted a Master Water Plan in 1987 for a 20-year period. The Plan indicated that the water supply was from groundwater provided at that time by 21 out of 24 wells. At that time, Well 12 was out of service due to potential contamination from gasoline but the problem was not expected to require replacement of the well. Also Wells 3 and 11 were out of service due to potential contamination by diobromochloropropane (DBCP), a commonly used fumigant and nematocide that had been identified as a potential contaminant in some of the water system wells at the time. The Plan stated that six wells were equipped with standby power and five wells had permanent chlorination equipment.

The 1987 Master Water Plan indicated that the City considered non-treatment and treatment methods to resolve the DBCP condition. Non-treatment alternatives considered were well replacement, well rehabilitation and blending with good quality groundwater. Treatment alternatives of air stripping, granular activated carbon absorption, ultraviolet irradiation with ozonation and ultraviolet irradiation with hydrogen peroxide were considered.

Currently the City still relies upon groundwater as its sole source of supply, however, in 2003 a contract for a surface water supply was executed with the Woodbridge Irrigation District that will be implemented in the near future. As indicated in the 2005 UWMP, the City water utility operates 26 wells. All wells are equipped to provide emergency chlorination and seven wells are equipped with granular activated carbon for removal of DBCP. Standby power has also been installed in seven wells and is readily available in the event of a power outage.

Table 2 identifies the type of the City's water source and whether it is by water right or by service contract and if the source of supply has been used.

TABLE 2 ANNUAL POTABLE WATER SUPPLY SOURCES

SUPPLY	QUANTITY (AFY)	WATER SUPPLY TYPE	EVER USED
Groundwater*	Well Capacity**	Appropriative Right*	Yes
WID Surface Water***	6,000	Contract	No

* The City currently uses groundwater as its sole source of supply. The City overlies a portion of the San Joaquin Valley groundwater basin, which is not currently adjudicated. As a municipal pumper, Lodi's water right is considered an appropriative right.

** The City/Utility operates 26 groundwater production wells. The 26 wells that currently provide water to the City have a combined capacity of 35,210 gallons per minute (GPM) or 50.7 million gallons per day (MGD).

*** The City recently entered into an agreement with Woodbridge Irrigation District (WID) to purchase 6,000 acre-feet per year (AFY) of surface water for a period of 40 years. (Source: 2005 UWMP)

As noted in the UWMP, the City has no additional water projects currently under development and has little or no opportunity for traditional transfers or exchanges. However, a recent contract with Woodbridge Irrigation District to divert 6,000 AFY of surface water supplies to the City is in place and the City is considering how this resource would be most effectively utilized. Development plans and project construction will proceed once the City Council has selected a resource utilization strategy. In addition, the City is actively seeking additional water supplies and has several potential programs under consideration.

B. STEP 1. DOCUMENTATION OF WHOLESALE WATER SUPPLIES

As noted above, the City currently uses groundwater supplies solely for its potable water; however, on May 13, 2003 the City executed an agreement with the Woodbridge Irrigation District to purchase 6000 AFY of surface water for a period of 40 years. The Agreement provides for an extension of the agreement for forty years and for banking water not used for three years up to 18,000 AF. The City plans to start using this water supply in 2010.

C. STEP 2. DOCUMENTATION OF GROUNDWATER SUPPLIES

The City currently uses groundwater as its sole source of supply. The city delivered an average of 15.19 MGD in 2004. The average day demand from 1995 to 2004 was 14.94 MGD and the maximum day demand was 28.62 MGD, which provides a ratio of 1.91 as a peaking factor that can be used to scale annual demand projections to maximum day demands. To meet these demands, there are currently 26 production wells in operation, which have a capacity of 35,210 gallons per minute or 50.7 million gallons per day (MGD).

At first glance, the City would appear to have an excessively large number of wells. However, the City has long pursued a strategy of using wells to meet peak flow and fire flow demands. By doing so, the City has been able to reduce the pipe size of the water distribution system and negate the need for surface water storage. Ratepayers have benefited with reduced infrastructure and maintenance costs. The reliance on ground water for peak flows is likely to remain a standard strategy as the large ground water basin size and recharge rates are such that the impact of short term high draws are negligible.

D. GROUNDWATER SUPPLY PROJECTIONS

1. Groundwater Assessment

Excerpts from Chapter 3 of the City's 2005 UMWP: 3.2.2 Future Groundwater Supply.

The continuing decline of groundwater levels in the aquifer underlying the City means that the sustainable annual groundwater supply available to the City is something less than what is currently extracted. As a member agency of GBA, the City is participating in the development of policies and programs, including groundwater recharge and conjunctive use programs, intended to help eliminate the

eastern San Joaquin County groundwater basin overdraft condition. Additionally, the City plans to reduce its overall groundwater pumping in the future. A safe yield of approximately 15,000 AFY (Treadwell and Rollo 2005) has been estimated for the aquifer serving Lodi based on water balance calculations (see Appendix G) performed using data primarily from the Eastern San Joaquin Groundwater Management Plan (Appendix F). This safe yield estimate reflects an acreage-based relationship. Therefore, as the City's land area increases, the estimated safe yield of the underlying aquifer will likely increase. The safe yield estimate will be revisited in the 2010 UWMP update. For the purposes of this UWMP, 15,000 AFY has been assumed as the amount of groundwater available during all future (post-2005) years. Although rigorous scientific analyses have not been performed, the City projects that some recharge of the groundwater basin will occur as the amount of groundwater pumped annually decreases. This result, however, is contingent on the cooperative efforts of all groundwater users within the basin, including other cities, agriculture, and private well owners, to reduce groundwater extraction. The City does not expect development of cones depression, significant changes in direction or amount of groundwater flow, changes in the movement or levels of contaminants, or changes in salinity and/or total dissolved solids (TDS) concentrations. The amount of groundwater that is projected to be pumped over the next 25 years is presented in Table 3-4.

TABLE 3-4 PROJECTED GROUNDWATER PUMPING (Guidebook Table 7)

	2005	2010	2015	2020	2025	2030
Annual Volume, (AFY)	17,300	15,000	15,000	15,000	15,000	15,000
Percent of Total Available Supply[a]	57%	52%	51%	50%	49%	48%

a. Refers to the total supplies shown in Table 3-5.

E. SURFACE WATER SUPPLY PROJECTIONS

3.2.3 Future Surface Water Supply (2005 UWMP excerpt)

As discussed in Section 3.1.4, in May 2003 the City entered into a 40-year agreement with WID for 6,000 AFY of surface water from the Mokelumne River. The diversion point has not yet been determined. The City is considering options for implementing this source before 2010. Therefore, 6,000 AFY of treated surface water is included in the supply projections presented in Table 3-5 below. The City is also considering the possibility of purchasing additional surface water supplies from WID; these supplies are not included in Table 3-5, however, as they are not considered "firm" supplies. (Note: The Agreement with WID is renewable for an additional 40 years, for a total of 80 years. The City Council is currently reviewing groundwater options for utilizing the surface water to serve current and future water demands.)

F. TOTAL GROUNDWATER AND SURFACE WATER PROJECTION

TABLE 3-5 CURRENT AND PLANNED WATER SUPPLIES (Guidebook Table 4)

SOURCE (AFY)	2005	2010	2015	2020	2025	2030
Groundwater[a], AFY	17,300	15,000	15,000	15,000	15,000	15,000
WID Surface Water, AFY	6,000	6,000	6,000	6,000	6,000	6,000
Recycled Water[b], AFY	7,200	7,700	8,300	8,940	9,630	10,380
TOTAL[c], AFY	**30,500**	**28,700**	**29,300**	**29,900**	**30,600**	**31,400**

a. Refer to Section 3.2.2 for more information
b. Based upon the amount of wastewater treated during 2004, according to City staff. Future recycled water supplies are extrapolated from the 2004 amount. Assumes the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to nearest hundred.

Source: 2005 UWMP

SECTION 6: DEMAND (GUIDEBOOK STEPS 3 AND 4)

For the 2005 UWMP, records of historical water production were obtained from the City's Public Works Department. The records included both maximum day and annual water production records. Water production is the volume of water measured at the source and includes all water delivered to residential, commercial, and public connections and also includes unaccounted-for water. The records are available from 1970 at the Department of Public Works.

EXCERPTED from the 2005 UWMP to provide the data outlined in Step 3, Detailing Existing and Planned Future Uses, as presented in the Guidebook for Implementation of SB 610, are pages 2-1 to 2-3, pages 3-1 to 3-8, and pages 4-1 to 4-7 with sections entitled:

Chapter 2 Supplier Service Area

- 2.1 Service Area Description
- 2.2 Climate
- 2.3 Other Demographic Factors
- 2.4 Population Projections

Chapter 3 Water Supply

- 3.1 Current Water Supply
  - 3.1.1 Background
  - 3.1.2 Water Supply Facilities
  - 3.1.3 Current Groundwater Supply
  - 3.1.4 Current Surface Water Supply
  - 3.1.5 Current Recycled Water Supply
  - 3.1.6 Water Distribution System
- 3.2 Future Water Supply
  - 3.2.1 Constraints on Existing Supplies
  - 3.2.2 Future Groundwater Supply
  - 3.2.3 Future Surface Water Supply
  - 3.2.4 Future Recycled Water Supply
  - 3.2.5 Planned Water Supply Projects
- 3.3 Exchange or Transfer Opportunities
- 3.4 Desalinated Water
- 3.5 Wholesale Supplies

Chapter 4 Water Demand

- 4.1 Past, Current, and Projected Water Demand
  - 4.1.1 Past and Current Demand
  - 4.1.2 Future Water Demand
- 4.2 Sales to Other Agencies
- 4.3 Other Demands
- 4.4 Total Demands

The aforementioned EXCERPTS are as follows:

CHAPTER 2. SUPPLIER SERVICE AREA

2.1 Service Area Description

The City is located in the Northern San Joaquin Valley in San Joaquin County and borders the Mokelumne River. The bulk of the City's geographical area extends from the Mokelumne River on the north, WID South Main Canal and Lower Sacramento Road on the west, Harney Lane on the south, and portions of Highway 99 and Central California Traction (CCT) Railroad on the east. The City's White Slough Water Pollution Control Facility (WSWPCF) lies approximately six miles to the southwest of the City. The City has an estimated 2005 population of 62,467 (California Department of Finance, 2005).

The City of Lodi Water Utility (Utility) is the sole water purveyor for the City of Lodi. The Utility's service area is contiguous with the City boundaries and covers approximately 12 square miles. There are a few minor connections outside the City. The service area includes a mix of residential, commercial, and industrial land use, and is characterized by essentially flat terrain. All future development being considered for the City is expected to occur within the present service area.

2.2 Climate

The City has cool, humid winters, and hot, dry summers. Temperatures average 60 °F annually, ranging from average winter morning lows in the upper 30's to average summer afternoon highs in the upper 80's (Western Regional Climate Center, 2005). Relative humidity ranges from 91 percent in winter months to 26 percent in summer months. During summer months, temperatures may exceed 100 ˚F, impacting water demands significantly. Annual rainfall averages approximately 18 inches, with most rainfall occurring between November and April. The combination of warmer temperatures and low precipitation during the summer results in peak water demands during that period. Reference evapotranspiration (ETo) values, which serve as indicators of how much water is required to maintain healthy agriculture and landscaping, range from 0.93 inches during December to 8.06 inches in July. Temperature, rainfall and evapotranspiration averages for the City are presented in Table 2-1.

TABLE 2-1 SERVICE AREA CLIMATE (Guidebook Table 3)[a]

MONTH	JAN	FEB	MARCH	APRIL	MAY	JUNE
Average ET_o[b] (in)	1.24	1.96	3.41	5.10	6.82	7.80
Average Rainfall[c] (in)	3.47	2.95	2.60	1.35	0.49	0.13
Average Temperature[c] (F)	45.65	50.40	54.15	58.90	64.90	70.30

TABLE 2-1 SERVICE AREA CLIMATE Continued (Guidebook Table 3)[a]

MONTH	JULY	AUG	SEPT	OCT	NOV	DEC	ANNUAL
Avg ET_o[b] (in)	8.06	7.13	5.40	3.72	1.80	0.93	**54.3**
Avg Rainfall[c] (in)	0.04	0.05	0.30	0.93	2.29	3.03	**17.63**
Avg Temp[c] (F)	73.70	72.70	69.95	62.60	52.55	45.65	**60.12**

a. The term "Guidebook X" refers to the table in the Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan by DWR.
b. California Irrigation Management Information System (CIMIS).
c. Western Regional Climate Center.

2.3 Other Demographic Factors

Lodi is built on a strong and broad based agricultural industry with national and industrial markets for its commodities and products. Wines, processed foods, nuts, fruit and milk are major commodities of the Lodi area and provide the basic material for food processing and packaging. These commodities support the operations of General Mills and Pacific Coast Producers, three (actually two) *companies in the business of processing local agricultural commodities. In addition, Lodi has a wide range of small, financially sound businesses. These companies range in size from 10 to 150 employees and produce a wide variety of products, services, and commodities.*

Recently, there has been an increase in industrial and residential development within the City. This new development, combined with the growing strength of the wine/grape industry, is a positive economic indicator for Lodi. These industries collectively have created approximately 850 new jobs.

The demographic factors affecting the City's water supply management planning include data on the largest customers, including those listed in Table 2-2 below.

TABLE 2-2 LARGE WATER CUSTOMERS

CUSTOMER	2004 WATER USE MG	% OF TOTAL SYSTEM
Lodi Unified School District	150,703,608	2.7
Pacific Coast Producers	130,632,769	2.4
City of Lodi (incl. parks)	113,024,617	2.0
General Mills	69,261,284	1.2
Cottage Bakery	35,077,460	0.6
Lodi Memorial Hospital	28,502,316	0.5
Certainteed	7,763,492	0.1
Valley Industries	8,334,291	0.2
Wine & Roses	8,371,534	0.2
Miller Packing Co.	8,442,676	0.2
TOTAL	**560,114,047**	**10.1%**

2.4 Population Projections

Currently, the City's population is approximately 62,467. Based on the City's assumed annual population growth rate of 1.5 percent, which was presented in the Lodi Wastewater Master Plan (West Yost & Associates, 2001) and reaffirmed during discussions with City staff, population in 2030 is expected to be approximately 90,636. Population projections from 2005 to 2030 are presented in Table 2-3 below. In addition, Table 2-3 presents population projections based on population growth rates of 1 percent and 2 percent; the population projections for these growth rates are provided for comparative purposes only.

TABLE 2-3 CURRENT AND PROJECTED POPULATION (Guidebook Table 2)

POPULATION GROWTH RATE[b]	SERVICE AREA POPULATION					
	2005[a]	2010	2015	2020	2025	2030
1.00%	62,467	65,653	69,002	72,522	76,222	80,110
1.50%	62,467	67,295	72,496	78,098	84,134	90,636
2.00%	62,467	68,969	76,147	84,072	92,823	102,484

a. California Department of Finance (DoF).
b. For the purposes of this UWMP, the City has assumed an annual population growth rate of 1.5 percent, used in previous reports (e.g., Wastewater Master Plan) for facilities planning. Growth rates of 1 and 2 percent are shown here for comparative purposes only.

As an additional comparison, the City's existing (1991) General Plan estimated the City's population for 2007 at 71,944 (not including the Planned Residential Reserve area), and 96,589 (including the Planned Residential Reserve area). The higher population estimates presented in the existing General Plan reflect a 1987-2007 growth rate of 2.0 percent.

CHAPTER 3. WATER SUPPLY

3.1 Current Water Supply

3.1.1 Background

The City currently uses groundwater as its sole source of supply. The City overlies a portion of the San Joaquin Valley groundwater basin, which is not currently adjudicated. The groundwater in the Lodi area exists under unconfined and semi-confined conditions. The Mehrten Formation is the most productive fresh water-bearing unit.

The City is located within the geomorphic province known as the Central Valley, which is divided into the Sacramento Valley and the San Joaquin Valley. The Central Valley is a large, northwestward-trending, asymmetric structural trough that has been filled with several miles of thick sediment (USGS 1986). The City lies within the San Joaquin Hydrologic Basin (DWR, Bulletin 118) that straddles portions of both the Sacramento and San Joaquin Valleys. Sediments of the San Joaquin Valley consist of

interlayered gravel, sand, silt, and clay derived from the adjacent mountains and deposited in alluvial-fax, floodplain, flood-basin, lacustrine, and marsh environments. Hydrogeologic units in the San Joaquin Basin include both consolidated rocks and unconsolidated deposits. The consolidated rocks include 1) the Victor Formation, 2) the Laguna Formation, and 3) the Mehrten Formation. The consolidated rocks generally yield small quantities of water to wells except for the Mehrten Formation, which is an important aquifer (DWR). The unconsolidated deposits include) continental deposits, 2) lacustrine and marsh deposits), 3) older alluvium, 4) younger alluvium, and 5) flood-basin deposits. The continental deposits and older alluvium are the main water-yielding units in the unconsolidated deposits.

Groundwater flow direction is generally toward the south in agreement with the regional groundwater flow gradient but may vary from south-southwest to south-southeast with local gradients likely influenced by pumping form municipal supply wells. Pumping tests on municipal wells indicate that they possess a large capture zone, and thus have a large influence upon groundwater flow. Pumping of municipal supply wells in the City is performed between 100 and 500 feet below ground surface (Geomatrix, 2006).

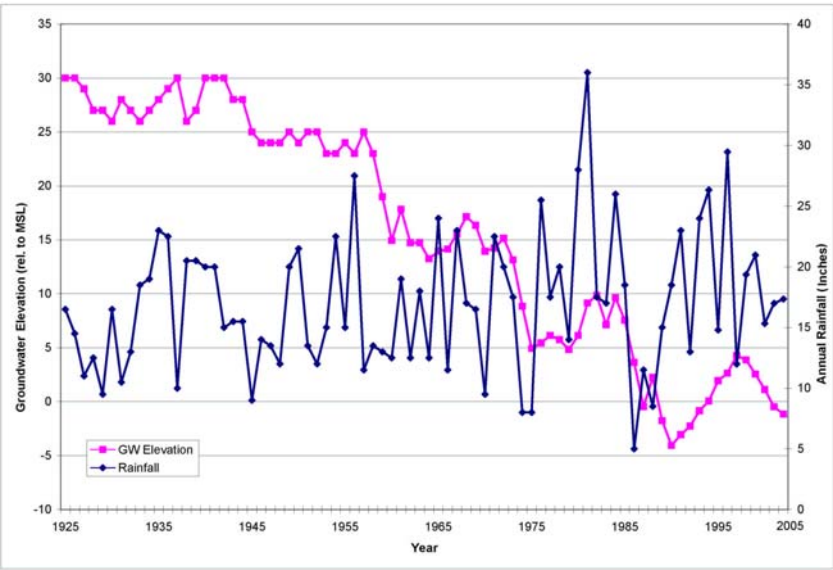


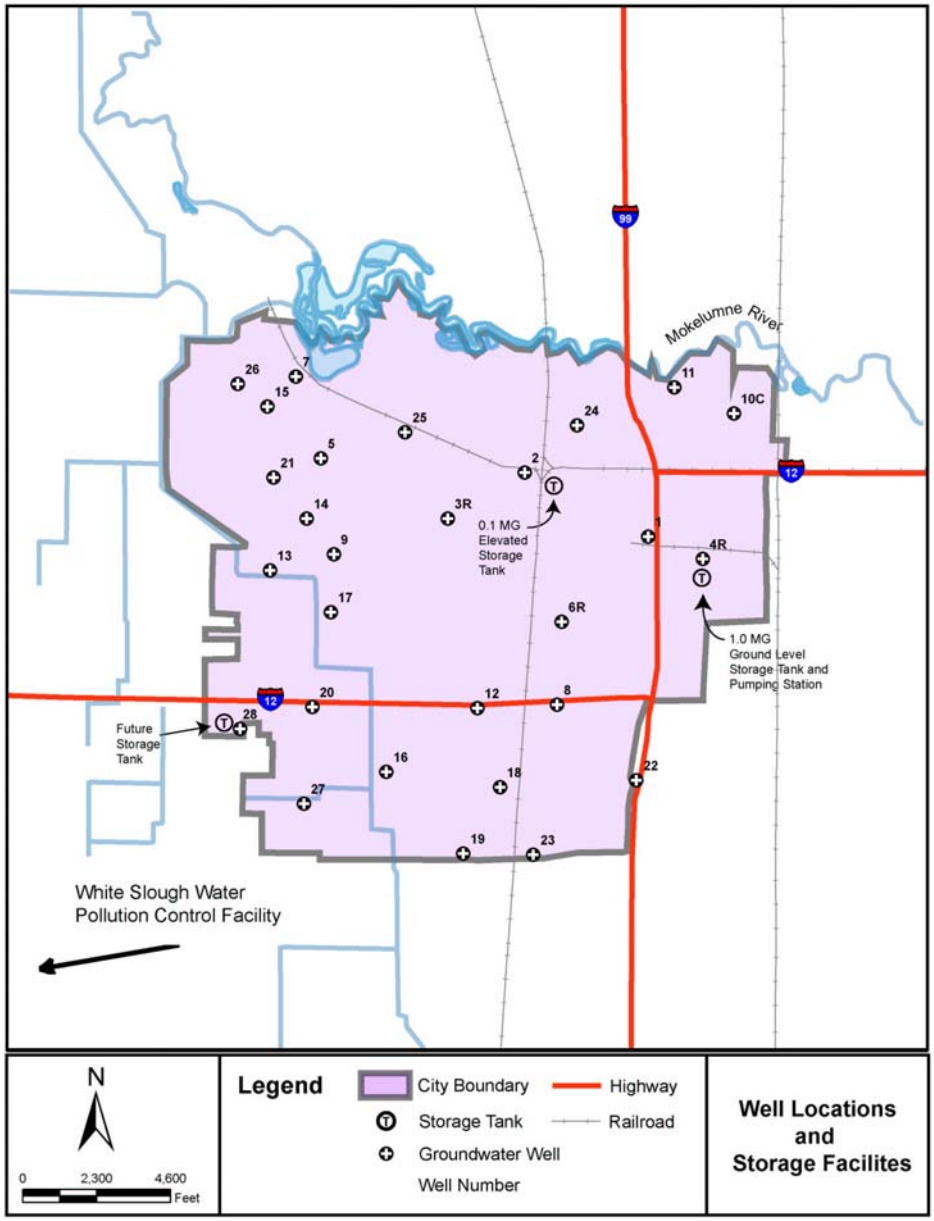
FIGURE 3-0: HISTORICAL GROUNDWATER ELEVATION
Source: City of Lodi Public Works Department

DWR has declared that the groundwater basin underlying Eastern San Joaquin County is overdrafted, and groundwater levels in the County and the City are generally decreasing. The groundwater levels also fluctuate over time depending on precipitation, aquifer recharge, and pumping demands. Groundwater elevations relative to mean sea level (MSL), and the corresponding annual precipitation from 1927 through 2004 are shown in Figure 3-0. Overall, the average annual decrease in groundwater levels from 1927 to 2004 has been 0.39 feet per year. Generally, groundwater elevations have decreased with the increase in population and water production. However, annual rainfall also influences groundwater elevation. The groundwater level increase from 1981 to 1984 can be partially attributed to the increase in annual rainfall from 1981 to 1983. Groundwater elevations for the years 1927 to 1961 were obtained from East Bay Municipal Utilities District (EBMUD) for the City's 12 square mile area. Groundwater elevation data from 1962 to the present were obtained from the City's Public Works Department for Well No. 2, one of the oldest production wells in the City.

3.1.2 Water Supply Facilities

The Utility operates 26 groundwater production wells. The locations of the wells are presented in Figure 3-2 and discussed in further detail below.

FIGURE 3-2: WELL LOCATIONS AND STORAGE FACILITIES



3.1.3 Current Groundwater Supply

The 26 wells that currently provide water to the City have a combined capacity of 35,210 gallons per minute (gpm), or 50.7 million gallons per day (mgd). The wells operate automatically on water pressure demand and pump directly into the distribution system. All wells are equipped to provide emergency chlorination as

needed. Historically, water has not required chlorination. Six wells are equipped with granular activated carbon (GAC) for the removal of diobromochloropropane (DBCP). Capacity information for the existing wells is summarized in Table 3-1.

TABLE 3-1 GROUNDWATER WELL CAPACITY

WELL NUMBER	WELL CAPACITY, GPM[b]	WELL CAPACITY, MGD[c]
1R	1,130	1.6
2	820	1.2
3R	820	1.2
4R[a]	1,960	2.8
5	1,180	1.7
6R	1,580	2.3
7	1,160	1.7
8	800	1.2
9	900	1.3
10C	1,300	1.9
11R	1,320	1.9
12	800	1.2
13	1,150	1.7
14	1,670	2.4
15	1,500	2.2
16[a]	1,110	1.6
17	1,800	2.6
18[a]	1,800	2.6
19	1,110	1.6
20[a]	2,070	3.0
21	2,050	3.0
22[a]	1,400	2.0
23[a]	1,410	2.0
24	1,420	2.0
25	1,580	2.3
26	1,370	2.0
TOTAL	**35,210**	**50.7**

a. Wells equipped with GAC
b. gpm = gallons per minute
c. mgd = million gallons per day

Table 3-2 presents the amounts of groundwater extracted by the City between 1970 and 2004.

TABLE 3-2 HISTORICAL GROUNDWATER PRODUCTION (Guidebook Table 5)[3]

YEAR	GROUNDWATER PRODUCTION, AF	% OF TOTAL WATER SUPPLY
1970	11,462	100%
1971	12,303	100%
1972	11,686	100%
1973	12,204	100%
1974	12,002	100%
1975	12,294	100%
1976	13,607	100%
1977	10,578	100%
1978	11,477	100%
1979	12,349	100%
1980	12,312	100%
1981	12,487	100%
1982	11,560	100%
1983	11,539	100%
1984	13,997	100%
1985	14,813	100%
1986	15,080	100%
1987	15,304	100%
1988	15,359	100%
1989	14,653	100%
1990	15,387	100%
1991	13,313	100%
1992	13,985	100%
1993	14,013	100%
1994	14,301	100%
1995	14,390	100%
1996	15,102	100%
1997	16,330	100%
1998	14,461	100%
1999	16,588	100%
2000	16,724	100%
2001	17,108	100%
2002	16,641	100%
2003	16,185	100%
2004	17,011	100%

a. The term “Guidebook X” refers to the table in the Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan by DWR.

3.1.4 Current Surface Water Supply

In May 2003, the City entered into an agreement with Woodbridge Irrigation District (WID) to purchase 6,000 acre-feet per year (AFY) of surface water for a period of 40 years. However, at the time this UWMP was prepared, the City had not yet begun using water from this supply. A copy of the City's Agreement with WID is included in Appendix D.

3.1.5 Current Recycled Water Supply

The City's wastewater discharge permit requires an agronomic application rate. According to discussions with City staff, approximately 2,500 AFY of secondary treated recycled water is currently used, primarily for irrigation in the area surrounding WSWPCF. This represents approximately 35 percent of the total treated wastewater produced at WSWPCF. The City discharges the non-irrigation water, treated to Title 22 tertiary standards, to the Delta. The Utility currently lacks the necessary infrastructure to distribute additional recycled water to more of its customers.

For a more detailed discussion of the City's recycled water supply, as well as the processes by which it is treated, refer to Chapter 8.

3.1.6 Water Distribution System

The City of Lodi's distribution system consists of a 100,000 gallon elevated storage tank, a 1 million gallon (MG) storage facility and pumping station, and the piping system. The 1 MG storage tank, located east of Highway 99 on Thurman Street, stores groundwater from an onsite well to meet peak hour demands and fire flows. The 100,000 gallon elevated storage tank is located on North Main Street. The storage facilities and their capacities are presented in Table 3-3. Their locations are shown in Figure 3-2.

TABLE 3-3 WATER STORAGE FACILITIES

STORAGE FACILITY	STORAGE VOLUME, MG
Elevated Tank Storage	0.10
Ground Level Storage Tank	1.00
TOTAL	**1.10**

Distribution mains in the City's piping system range from 14 inches to 2 inches in diameter, and the entire distribution system consists of approximately 225 miles of pipe. The City is in the process of replacing the 2-inch and 3-inch diameter mains as well as other deficient pipes.

A summary of the City's current and planned water supplies is presented in Table 3-5.

3.2 Future Water Supply

3.2.1 Constraints on Existing Supplies

The City's current water supply system is constrained by 1) the pumping capacity of its currently active wells, and 2) a longer-term reduction in supply due to the overdrafting currently taking place in the City's groundwater basin. Although the declining groundwater basin is a result of groundwater extraction by all groundwater pumpers in the area, including other cities, agriculture, private well owners, and the City itself, the City plans to reduce its groundwater pumping in the long term as part of what will have to be a regional effort to stabilize the groundwater basin. A copy of the GBA Groundwater Management Plan is included in Appendix F.

3.2.2 Future Groundwater Supply

The continuing decline of groundwater levels in the aquifer underlying the City means that the sustainable annual groundwater supply available to the City is something less than what is currently extracted. As a member agency of GBA, the City is participating in the development of policies and programs, including groundwater recharge and conjunctive use programs, intended to help eliminate the eastern San Joaquin County groundwater basin overdraft condition. Additionally, the City plans to reduce its overall groundwater pumping in the future. A safe yield of approximately 15,000 AFY (Treadwell and Rollo, 2005) has been estimated for the aquifer serving Lodi based on water balance calculations (see Appendix G) performed using data primarily from the Eastern San Joaquin Groundwater Management Plan (Appendix F). This safe yield estimate reflects an acreage-based relationship. Therefore, as the City's land area increases, the estimated safe yield of the underlying aquifer will likely increase. The safe yield estimate will be revisited in the 2010 UWMP update. For the purposes of this UWMP, 15,000 AFY has been assumed as the amount of groundwater available during all future (post-2005) years. Although rigorous scientific analyses have not been performed, the City projects that some recharge of the groundwater basin will occur as the amount of groundwater pumped annually decreases. This result, however, is contingent on the cooperative efforts of all groundwater users within the basin, including other cities, agriculture, and private well owners, to reduce groundwater extraction. The City does not expect development of cones of depression, significant changes in direction or amount of groundwater flow, changes in the movement or levels of contaminants, or changes in salinity and/or total dissolved solids (TDS) concentrations. The amount of groundwater that is projected to be pumped over the next 25 years is presented in Table 3-4.

TABLE 3-4 PROJECTED GROUNDWATER PUMPING (Guidebook Table 7)

YEAR	2005	2010	2015	2020	2025	2030
Annual Volume, AF	17,300	15,000	15,000	15,000	15,000	15,000
% of Total Available Supply[a]	57%	52%	51%	50%	49%	48%

a. Refers to the total supplies shown in Table 3-5.

3.2.3 Future Surface Water Supply

As discussed in Section 3.1.4 in May 2003 the City entered into a 40-year agreement with WID for 6,000 AFY of surface water from the Mokelumne River. The diversion point has not yet been determined. The City is considering options for implementing this source before 2010. Therefore, 6,000 AFY of treated surface water is included in the supply projections presented in Table 3-5 below. The City is also considering the possibility of obtaining additional surface water supplies from WID; these supplies are not included in Table 3-5, however, as they are not yet considered "firm" supplies.

3.2.4 Future Recycled Water Supply

As discussed in Section 3.1.5, the City currently treats approximately 7,200 AFY of wastewater at WSWPCF, of which 2,500 AFY is recycled in the vicinity of WSWPCF. WSWPCF has adequate capacity to treat all wastewater flows to Title 22 standards. The City is in the process of developing a Recycled Water Master Plan (RWMP) that will outline additional distribution of this supply to the Utility's customers. For the purposes of this UWMP, all treated wastewater produced at WSWPCF has been treated as recycled water supply and is included in Table 3-5 below. The amount of recycled water available increases with time, because as the City's population increases, the amount of wastewater available for reclamation will also increase. For a more detailed discussion of recycled water supply projections, refer to Section 8.6.

TABLE 3-5 CURRENT AND PLANNED WATER SUPPLIES (Guidebook Table 4)

SOURCE (AFY)	2005	2010	2015	2020	2025	2030
Groundwater[a], AFY	17,300	15,000	15,000	15,000	15,000	15,000
WID Surface Water, AFY	6,000	6,000	6,000	6,000	6,000	6,000
Recycled Water[b], AFY	7,200	7,700	8,300	8,940	9,630	10,380
TOTAL[c], AFY	**30,500**	**28,700**	**29,300**	**29,900**	**30,600**	**31,400**

a. Refer to Section 3.2.2 for more information.
b. Based on the amount of wastewater treated during 2004, according to City staff. Future recycled water supplies are extrapolated from the 2004 amount. Assumes that the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to nearest hundred.

3.2.5 Planned Water Supply Projects

At the present time the City does not have approved plans for any additional water supply projects. The City has participated in the Mokelumne River Regional Water Storage and Conjunctive Use (MORE WATER) Feasibility Analysis. The MORE WATER project, if approved, would capture unappropriated flows from the Mokelumne River for storage and beneficial use.

3.3 Exchange or Transfer Opportunities

The City does not currently have any approved plans to pursue exchange or transfer opportunities.

3.4 Desalinated Water

At the present time the City does not foresee any opportunities for the use of desalinated water, which includes ocean water, brackish ocean water, and brackish groundwater, as long-term supplies.

3.5 Wholesale Supplies

Since surface water will be purchased from WID, WID is considered a wholesale water supplier by DWR. As such, the City has provided demand projections to WID for the next 25 years. Similarly, the City has received availability projections from WID for the same time period. These demand and availability projections are presented in Table 3-6 and Table 3-7 below. As discussed previously, the City has not yet begun to use this water supply. As stated in the City's contract with WID, any water not taken by the City during the first three years of the contract (May 2003 to May 2006) may be "banked" and delivered to the City in subsequent years, provided WID has sufficient water available. The banked supply may not exceed 18,000 AF. To date, over 16,000 AF of water has been banked. The City has not made any formal plans at this time to use any of its banked supply, in addition to the normal 6,000 AFY, for any of the years shown in the tables below. However, the projected supplies and demands shown below may increase if and when the City decides to use its banked supply. The magnitude and availability of banked supply to be delivered will be discussed with WID at an appropriate time(s) in the future.

TABLE 3-6 DEMAND PROJECTIONS FOR WHOLESALE SUPPLY

WHOLESALE SUPPLY	PROJECTED DEMAND[a]					
	2005	2010	2015	2020	2025	2030
WID Surface Water, AFY	0	6,000	6,000	6,000	6,000	6,000

a. Subject to change with WID and City approval. Although the City may take water deliveries in excess of 6,000 AFY from its "banked" supply, no formal plans to do so have been developed at this time.

TABLE 3-7 AVAILABILITY PROJECTIONS FROM WHOLESALE SUPPLIER

WHOLESALE SUPPLY	PROJECTED AVAILABILITY[a]					
	2005	2010	2015	2020	2025	2030
WID Surface Water, AFY	6,000	6,000	6,000	6,000	6,000	6,000

a. Subject to change with WID and City approval. Although the City may take water deliveries in excess of 6,000 AFY from its "banked" supply, no formal plans to do so have been developed at this time.
b. Reliability of WID supply is indicated in the City's contract with WID in Appendix D.

Wholesale supply reliability is presented in Chapter 6. Although changes in deliverable volumes of water for future hydrologic scenarios have not been formally predicted at this time, Chapter 6 presents the most restrictive possible cases for the future.

CHAPTER 4. WATER DEMAND

4.1 Past, Current, and Projected Water Demand

Water demand projections provide the basis for sizing and staging future water supply facilities. Water use and production records, combined with projections of population and urban development, provide the basis for estimating future water requirements. This chapter presents a summary of available demographic and water use data and the resulting projections of future water needs for the City.

4.1.1 Past and Current Water Demand

Records of historical water production were obtained from the City's Public Works Department. These data include both maximum day and annual water production. Water production is the volume of water measured at the source, which includes all water delivered to residential, commercial, and public authority connections, as well as unaccounted-for water.

Annual Water Production

Groundwater production from 1970 to 2004 is presented in Table 3-2. Total water production in 2004 was 17,011 acre-feet (AF). Water use by customer class can only be estimated, as most of the Utility's customers are not currently metered.

Maximum Day Demand

Daily demand fluctuates throughout the year, due primarily to seasonal climate changes. Water demands are significantly higher in the summer than the winter. System production facilities must be sized to meet the demand on the maximum day of the year, not just the average. Water systems are sized to meet the greater of 1) the maximum day demands plus fire flow, or 2) peak hour demand. Fire flow and peak hour demand are not addressed in this UWMP.

The average day and maximum day demands for years 1977 through 2004 are presented in Table 4-1 The maximum day demand in 2004 was 19,014 gpm, in comparison with the total well production capacity of 35,210 gpm. The ratio between average and maximum day demands provides a maximum day peaking factor that can be used to scale annual demand projections to maximum day levels. The average maximum day peaking factor from 1995 to 2004 is 1.91.

TABLE 4-1 MAXIMUM DAY DEMAND AND PEAKING FACTORS

ANNUAL AVERAGE				MAXIMUM DAY		
YEAR	AFY	MGD	GPM	MGD	GPM	PEAKING FACTOR[b]
1977	10,578	9.44	6,556	19.28	13,389	2.04
1978	11,478	10.25	7,118	--[a]	--	--[a]
1979	12,349	11.02	7,653	22.50	15,625	2.04
1980	12,312	10.99	7,632	24.00	16,667	2.18
1981	12,487	11.15	7,743	22.34	15,514	2.00
1982	11,560	10.32	7,167	21.30	14,792	2.06
1983	11,539	10.30	7,153	21.67	15,049	2.10
1984	13,997	12.50	8,681	26.20	18,194	2.10
1985	14,814	13.22	9,181	--[a]	--	--[a]
1986	15,081	13.46	9,347	26.91	18,688	2.00
1987	15,305	13.66	9,486	27.00	18,750	1.98
1988	15,360	13.71	9,521	28.40	19,722	2.07
1989	14,654	13.08	9,083	28.50	19,792	2.18
1990	15,387	13.74	9,542	24.29	16,868	1.77
1991	13,313	11.88	8,250	21.55	14,965	1.81
1992	13,985	12.48	8,667	24.00	16,667	1.92
1993	14,013	12.51	8,688	24.10	16,736	1.93
1994	14,301	12.77	8,868	22.94	15,931	1.80
1995	14,390	12.85	8,924	24.64	17,111	1.92
1996	15,102	13.48	9,361	27.93	19,396	2.07
1997	16,330	14.58	10,125	28.68	19,917	1.97
1998	14,461	12.91	8,965	29.66	20,597	2.30
1999	16,587	14.81	10,285	28.32	19,667	1.91
2000	16,724	14.93	10,368	29.48	20,472	1.97
2001	17,108	15.27	10,606	30.10	20,903	1.97
2002	16,641	14.86	10,317	28.70	19,931	1.93
2003	16,185	14.45	10,034	26.68	18,530	1.85
2004	17,011	15.19	10,546	27.38	19,014	1.80
Average 1977 – 2004		**13.48**	**9,364**	**27.45**	**19,063**	**1.93**
Average 1995 – 2004		**14.94**	**10,374**	**28.62**	**19,873**	**1.91**

a. Data unavailable *Source: City of Lodi Public Works Department*
b. Maximum day peaking factor = maximum day demand/annual average day demand

Unaccounted-for Water

Unaccounted-for water use is unmetered water use, such as water use for fire protection and training, system and hydrant flushing, sewer cleaning, system leaks, and unauthorized connections. Unaccounted-for water can also result from meter inaccuracies. Since the City's system is not completely metered, data are unavailable

for determining the percent of unaccounted-for water. Unaccounted-for water is generally assumed to equal approximately 10% of total water production.

Unit Water Use

Recent historical unit water use, expressed as gallons per capita per day (gpcd), is shown in Table 4-2. These unit demands include commercial usage, industrial usage, and unaccounted-for water.

TABLE 4-2 RECENT HISTORICAL UNIT WATER USE

YEAR	POPULATION	UNIT WATER USE[a], GPCD
1999	56,926	260
2000	57,763	258
2001	58,600	261
2002	59,431	250
2003	60,521	239
2004	61,325	248

a. Based on total municipal water production provided by City of Lodi staff.

4.1.2 Future Water Demand

Future water demands are estimated based on 1) a constant 1.5% annual increase in the City's demand, 2) a constant 1.5% annual increase in the number of service connections, 3) the assumption that the City will install and begin reading water meters at a rate of approximately 950 per year, starting in 2006 or 2007, and 4) the assumption that as existing service connections become metered they will exhibit slightly lower unit demand factors than existing service connections without meters. It has been assumed that a residential service connection will exhibit a demand reduction of approximately 15%[1] once billing has commenced at commodity rates. Demands were projected based on actual water use in 2004. These projections are shown in Table 4-5 and illustrated in Figure 4-1. By 2030, average annual water demands[2] are expected to have increased from current demands by approximately 20%, from about 19,800 AFY (17.7 mgd) in 2005 to 23,800 AFY (21.2 mgd) in 2030. Demand projections by water use sector are presented in Table 4-3.

The projections in Table 4-5 represent normal (average) conditions, as actual use varies based on a number of factors. For this reason, it can be expected that there will be variations in the City's future water usage. The values predicted in these tables have been used in this UWMP, as they are assumed to represent average conditions of water demand.

[1] Based on 1) information from the California Urban Water Conservation Council (CUWCC, 2005, and 2) judgment of City of Lodi staff

[2] Including 2,500 AFY currently being recycled in the vicinity of WSWPCF

TABLE 4-3: PAST, CURRENT, AND PROJECTED WATER USE BY CUSTOMER CLASS (Guidebook Table 12)[a]

Year	Customer Class	Unmetered Connections[e]	Unmetered Deliveries[f,G], AFY	Metered Connections[e,H]	Metered Deliveries[c,F,G], AFY	Total Number of Connections	Total Municipal Deliveries[d], AFY
2001	SFR	15,410	10,071	0	0	15,410	10,071
	MFR	577	2,828	0	0	577	2,828
	Commercial/ Institutional	310	569	950	1,744	1,260	2,313
	Industrial	0	0	53	1,632	53	1,632
	Landscape	8	73	21	191	29	264
	TOTAL [b]	**16,300**	**13,500**	**1,000**	**3,600**	**17,300**	**17,100**
2005	SFR	16,537	9,955	0	0	16,537	9,955
	MFR	639	2,882	0	0	639	2,882
	Commercial/ Institutional	310	750	1,018	2,462	1,328	3,211
	Industrial	0	0	56	945	56	945
	Landscape	8	76	23	219	31	295
	TOTAL [b]	**17,500**	**13,700**	**1,100**	**3,600**	**18,600**	**17,300**
2010	SFR	13,205	7,949	4,610	2,775	17,815	10,725
	MFR	509	2,294	180	811	688	3,105
	Commercial/ Institutional	249	602	1,182	2,858	1,431	3,459
	Industrial	0	0	60	1,018	60	1,018
	Landscape	0	-2	34	320	33	318
	TOTAL [b]	**14,000**	**10,800**	**6,100**	**7,800**	**20,000**	**18,600**
2015	SFR	8,730	5,255	10,462	6,298	19,192	11,554
	MFR	334	1,504	408	1,840	742	3,345
	Commercial/ Institutional	159	384	1,382	3,343	1,541	3,727
	Industrial	0	0	65	1,094	65	1,094
	Landscape	0	0	36	345	36	345
	TOTAL [b]	**9,200**	**7,100**	**12,400**	**12,900**	**21,600**	**20,100**
2020	SFR	4,255	2,561	16,420	9,885	20,675	12,446
	MFR	158	715	640	2,888	799	3,603
	Commercial/ Institutional	69	167	1,591	3,848	1,660	4,015
	Industrial	0	0	70	1,178	70	1,178
	Landscape	0	0	39	372	39	372
	TOTAL [b]	**4,500**	**3,400**	**18,800**	**18,200**	**23,200**	**21,600**

Continued on next page

Year	Customer Class	Unmetered Connections[e]	Unmetered Deliveries[f,G], AFY	Metered Connections[e,H]	Metered Deliveries[c,F,G], AFY	Total Number of Connections	Total Municipal Deliveries[d], AFY
2025	SFR	0	0	22,273	13,409	22,273	13,409
	MFR	0	0	861	3,884	861	3,884
	Commercial/ Institutional	0	0	1,788	4,324	1,789	4,324
	Industrial	0	0	75	1,269	75	1,269
	Landscape	0	0	42	401	42	401
	TOTAL [b]	**0**	**0**	**25,000**	**23,300**	**25,000**	**23,300**
2030	SFR	0	0	23,994	14,445	23,994	14,445
	MFR	0	0	927	4,181	927	4,181
	Commercial/ Institutional	0	0	1,927	4,659	1,927	4,659
	Industrial	0	0	81	1,371	81	1,371
	Landscape	0	0	45	428	45	428
	TOTAL [b]	**0**	**0**	**27,000**	**25,100**	**27,000**	**25,100**

a. The term "Guidebook X" refers to the table in the Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan by DWR.
b. Rounded to the nearest hundred.
c. Does not reflect demand reductions as a result of meter implementation. Refer to Table 4-5 for water savings as a result of meter implementation.
d. Does not include 2,500 AFY currently being recycled in the vicinity of WSWPCF.
e. Assumes 10 dwelling units per MFR connection.
f. Assumes 75% of total water deliveries go to SFR and MFR connections. This assumption is based on recent water usage statistics for the City, and is consistent with historical per capita water usage.
g. Assumes that the per-dwelling-unit demand factor for MFR connections is 75% of the unit demand factor for SFR connections.
h. Assumes that approximately 950 existing connections are retrofitted with meters every year between 2006 and 2025. The actual rate at which meters are installed/retrofitted may be greater.

4.2 Sales to Other Agencies

At the present time, the City does not foresee any opportunities for sales to other agencies.

4.3 Other Demands

Other water uses and losses in the City's service area are presented in Table 4-4 below. The 2,500 AFY shown for recycled water includes the amount of water currently used to irrigate land in the vicinity of WSWPCF. Although the land is irrigated with non-potable secondary treated wastewater, the 2,500 AFY must be subtracted from the total amount of wastewater available to the City for reclamation and reuse in municipal applications. For the purposes of this UWMP, therefore, the 2,500 AFY is considered a demand.

TABLE 4-4 ADDITIONAL WATER USES AND LOSSES (Guidebook Table 14)

WATER USE	2000	2005	2010	2015	2020	2025	2030
Recycled Water[a]	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Unaccounted for System Losses[b]	1,672	1,727	1,774	1,801	1,837	1,883	2,029
TOTAL	**4,172**	**4,227**	**4,274**	**4,301**	**4,337**	**4,383**	**4,529**

a. Reflects the amount of recycled water currently recycled in the vicinity of WSWPCF. Does not include 1 mgd promised by the City in a "will serve" letter to Northern California Power Agency, as the power plant that would utilize this water is only potential at this time.
b. Unaccounted-for system losses are generally assumed to be approximately 10% of total water production. Because water usage is measured at the City's wells, unaccounted-for water is "accounted for" in the City's total demand projections in Table 4-5 (i.e., it should not be added to the demands in Table 4-5).

4.4 Total Demands

The City's total average annual demands are presented in Table 4-5 and Figure 4-1. For the purposes of this UWMP, only the projected future demands with conservation are considered in subsequent analyses. It should be noted that while Table 4-3 includes projections for municipal demands only, Table 4-5 includes a demand of 2,500 AFY for non-municipal recycling (refer to previous section).

TABLE 4-5 TOTAL DEMANDS (Guidebook Table 15)

YEAR		2005	2010	2015	2020	2025	2030
Demand (AFY)	Without Conservation[a]	19,800	21,100	22,500	24,100	25,800	27,600
	With Conservation[a,b]	19,800	20,400	20,900	21,600	22,300	23,800

a. Includes 2,500 AFY of recycled water currently recycled in the vicinity of WSWPCF. Table 4-3 includes municipal demands only, and therefore does not match this table.
b. Assumes a 15% reduction in demand for metered residential service connections.

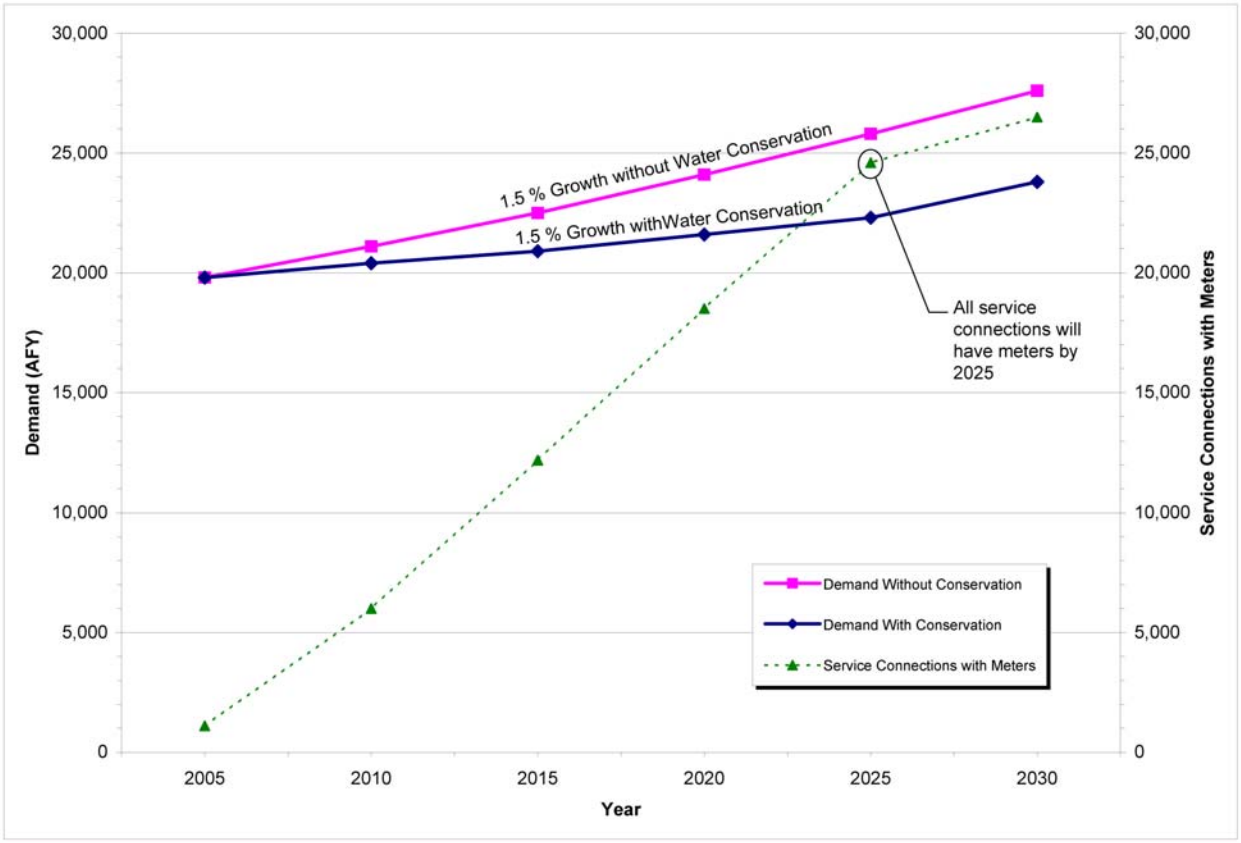


FIGURE 4-1: PROJECTED WATER DEMAND

STEP 4 - DOCUMENTING DRY YEARS SUPPLY

Also EXCERPTED from the 2005 UWMP to provide the data outlined in Step 4 of the Guidelines for Implementation of SB 610 are pages 6-1 to 6-4 with sections entitled as follows:

Chapter 6 Water Supply Reliability

6.1 Climate
- 6.1.1 Reliability and Vulnerability of Water Supply to Seasonal or Climatic Changes

6.2 Projected Normal Water Year Supply
6.3 Projected Single Dry Year Supply
6.4 Projected Multiple Dry Year Supply
- 6.4.1 Minimum Supply Volumes for Next Three Years
- 6.4.2 Basis for Normal, Single Dry, and Multiple Dry Year Water Data

6.5 Supply Inconsistencies

The Excerpts noted above are as follows:

CHAPTER 6 WATER SUPPLY RELIABILITY

This section provides a description of the potential variability in the City's water supplies caused by environmental, legal, and climatic factors, as well as the steps being taken by the City to address these potential concerns.

6.1 Climate

In California, climate can significantly affect the reliability of water supplies in certain regions. This section analyzes the vulnerability of the City's water supplies to climatic effects.

6.1.1 Reliability and Vulnerability of Water Supply to Seasonal or Climatic Changes

Groundwater

Although the City's groundwater basin is replenished in part by the Mokelumne River, the annual quantity of groundwater available does not vary significantly due to seasonal or climatic changes. Additionally, seasonal or climatic changes are not expected to impair the City's ability to extract groundwater, as seven of the City's wells are equipped with emergency generators.

Surface Water

The reliability of the City's surface water supply may be affected by drought. The City's contract for surface water delivery from WID, which diverts water from the Mokelumne River, is subject to curtailments of up to fifty percent during dry years. WID is required by the contract to annually provide the City, on or about May 1, with a preliminary estimate of whether or not the City's deliveries will be curtailed in a

given year. Final estimates of any curtailment in a given year must be provided to the City on or about July 1.

Recycled Water

The amount of recycled water available to the City comes primarily from indoor water use within the City's limits and is not expected to fluctuate significantly due to seasonal or climatic changes.

6.2 Projected Normal Water Year Supply

During normal water years, no curtailments or other reductions in supply are expected for any of the City's supplies. The projected normal water year supplies from 2010 to 2030 are shown in Table 6-1.

TABLE 6-1 WATER SUPPLY RELIABILITY (Guidebook Table 8)[a]

WATER YEAR TYPE	SUPPLY TYPE	2010	2015	2020	2025	2030
Normal	Groundwater, AFY	15,000	15,000	15,000	15,000	15,000
	Surface Water, AFY	6,000	6,000	6,000	6,000	6,000
	Recycled Water[b], AFY	7,700	8,300	8,940	9,630	10,380
	TOTAL[c], AFY	**28,700**	**29,300**	**29,900**	**30,600**	**31,400**

a. The term "Guidebook X" refers to the table in the Guidebook to Assist Water Suppliers in the Preparation of a 2005 Urban Water Management Plan by DWR.
b. Extrapolated from the amount of wastewater treated in 2004. Assumes that the permitted capacity of WSWPCF will be increased as necessary.
c. Rounded to the nearest hundred

6.3 Projected Single Dry Year Supply

During single dry water years, there may be up to a 10.5% reduction[3] in the City's normal combined water supplies, reflecting a 50% curtailment in the City's surface water supply by WID. No reductions are assumed for the City's recycled water or groundwater supplies. The projected single dry water year supplies from 2010 to 2030 are shown in Table 6-2.

6.4 Projected Multiple Dry Year Supply

Because the City's surface water supply is the only supply that is considered to be susceptible to dry water years, and because 50% is the maximum annual curtailment allowed under the City's contract with WID, supplies available during multiple dry water years are assumed to be no different than supplies available during single dry water years. The projected multiple dry water year supplies from 2010 to 2030 are shown in Table 6-2.

[3] Assuming the amount of available recycled water increases over time, the maximum percent reduction projected will decrease from 10.5% in 2010 to 9.6% in 2030.

TABLE 6-2 **SINGLE DRY AND MULTIPLE DRY WATER SUPPLY PROJECTIONS (Guidebook Table 8)**

WATER YEAR TYPE	SUPPLY TYPE	2010	2015	2020	2025	2030
Single Dry	Groundwater, AFY	15,000	15,000	15,000	15,000	15,000
	Surface Water, AFY	3,000	3,000	3,000	3,000	3,000
	Recycled Water[a] AFY	7,700	8,300	8,940	9,630	10,380
	TOTAL[c] AFY	**25,700**	**26,300**	**26,900**	**27,600**	**28,400**
Multiple Dry	Groundwater, AFY	15,000	15,000	15,000	15,000	15,000
	Surface Water, AFY	3,000	3,000	3,000	3,000	3,000
	Recycled Water[a] AFY	7,700	8,300	8,940	9,630	10,380
	TOTAL[c] AFY	**25,700**	**26,300**	**26,900**	**27,600**	**28,400**
Summary	Single Dry Water Year, AFY	25,700	26,300	26,940	27,630	28,380
	% of Normal	**90%**	**90%**	**90%**	**90%**	**90%**
	Multiple Dry Water Years, AFY	25,700	26,300	26,940	27,630	28,380
	% of Normal	**90%**	**90%**	**90%**	**90%**	**90%**

a. Extrapolated from the amount of wastewater treated in 2004. Assumes that the permitted capacity of WSWPCF will be increased as necessary.
b. Rounded to the nearest hundred

The future supply volumes presented in Sections 6.2 to 6.4 represent the water to which the City has the legal rights to use. This should not be confused with water that can readily be distributed to the Utility's customers, as additional infrastructure must be constructed before the total volumes presented in the tables above can be distributed to the City. In order to provide the City with surface water, for example, intake facilities, a surface water treatment plant, and additional distribution pipeline could be required.

6.4.1 Minimum Supply Volumes for the Next Three Years

Under agreements with the East Bay Municipal Utilities District (EBMUD), WID obtains water stored in Pardee and Comanche reservoirs. Since both of these reservoirs are currently full, supply volumes for the City of Lodi for the next three years are expected to be "normal." However, the minimum supply volumes for 2006 through 2008, or the supplies available if the City's contract with WID faced maximum curtailments, are presented in Table 6-3.

TABLE 6-3 MINIMUM SUPPLY VOLUMES FOR 2006-2008 (Guidebook Table 24)

SUPPLY TYPE	2006	2007	2008
Groundwater, AFY	15,000	15,000	15,000
Surface Water, AFY	3,000	3,000	3,000
Recycled Water, AFY	7,200	7,300	7,400
TOTAL, AFY	**25,200**	**25,300**	**25,400**

6.4.2 Basis for Normal, Single Dry, and Multiple Dry Year Water Data

The data presented in Sections 6.2 through 6.4 were developed based on 1) the assumptions that the City's groundwater and recycled water supplies are not susceptible to short term drought conditions, and 2) the City's contract with WID. Since the City's contract with WID is relatively new, there have been no historical curtailments in the City's surface water supply upon which to base future dry water year projections. Hence, the maximum allowable curtailment has been assumed for these circumstances. The base year for all water year data is 2005.

TABLE 6-4 BASIS OF WATER YEAR DATA (Guidebook Table 9)

WATER YEAR TYPE	BASE YEAR
Normal	2005
Single Dry	2005
Multiple Dry	2005

6.5 Supply Inconsistencies

Water supply from the City's only wholesale supplier, WID, is susceptible primarily to drought conditions, when diversions from the Mokelumne River may be reduced by WID. Due to the infancy of this contract, there are no historical reductions upon which to base assumptions. Even in the most severe drought conditions, however, WID may only reduce the City's supply by 50%. Supply reliability projections for this source are presented in Table 3-7.

Water supply from the City's groundwater wells is considered to be very consistent. Historical fluctuations in groundwater levels due to changes in climatic conditions have been minor, and have not significantly impacted well production capacity. Additionally, six of the City's wells are equipped with granular activated carbon (GAC), and provide added insurance against inconsistencies caused by the presence of contaminants in the City's aquifer. Finally, the availability of seven emergency generators at various well locations ensures the City's ability to extract groundwater during extended power outages.

As discussed previously, the groundwater basin underlying the City is in overdraft, and groundwater levels are decreasing by approximately 0.39 ft/yr. From an extraction standpoint, however, this is a relatively slow process, and the City does not anticipate that overdrafting conditions will significantly impact its ability to extract groundwater in the short term. However, the City remains committed to eliminating the overdraft condition in the long term and has been an active participant in actions to accomplish this task. As a member of GBA, the City has participated in the development of regional groundwater recharge and conjunctive use programs intended to replenish Eastern San Joaquin County's groundwater basin and promote sustainability for the future. A copy of the GBA Groundwater Management Plan is included in Appendix F.

Recycled water supply for the City is considered to be very consistent. Indoor water consumption by the City's customers, which does not significantly fluctuate with climatic conditions like outdoor water use, is the source of the City's recycled water supply. As such, the amount of recycled water available to the City is not expected to fluctuate in the future; indeed, as the number of water and sewer connections increase, so too will the City's recycled water supply.

As a result of the relative consistency of the City's water supplies, there are no plans at this time to replace any of the City's supply sources with alternative sources. The City is part of a group of Eastern San Joaquin County water users negotiating a conjunctive use project with EBMUD. Recently, however, negotiations surrounding this project have stagnated. Although this project bears the possibility of increasing the City's future water supplies, for the purposes of this UWMP this potential supply is not reflected in Table 3-5.

CHAPTER 5: STEPS 3 AND 4 - DOCUMENTING DEMAND EFFECTS OF THE PROJECT

BACKGROUND

From City records, the total water deliveries in 2004 were 17,011 AFY or 15.18 MGD and the population for the City was 61,325. The annual population growth rate has been estimated at 1.5% from 2004 to 2030. Also in 2004, water use per capita was 248 gpcd in comparison to 285 gpcd estimated in 1987. This is a citywide average that includes commercial, industrial, and public water use.

The Westside/SW Gateway Project area consists of 409.5 acres of agricultural land and residences. The existing water source for the land within the Project area is primarily groundwater wells. The State of California DWR has estimated that the regional average on-farm unit applied water use for irrigation in the San Joaquin region is 3.2 acre feet per year per acre[1]. The current agricultural irrigation practice within the project area is either fallow or a drip system, so actual water use in the project area may be significantly less than the regional average.

[1]*California Department of Water Resources, California Water Plan Update 2005 Volume 3 – Regional Reports, Chapter 7, San Joaquin River Hydrologic Region at pp. 7-14*

Water Supply Considerations

The City has accepted 15,000 AFY as the demand that the groundwater basin can accept without experiencing significant draw down, based upon the City's current land area.

The 2005 UWMP states that as water meters are installed, it is expected that water use by those customers will decline and, by completion of the meter installation program, water use will decrease by about 15%. In addition, other conservation methods are being pursued by the City. For planning purposes, the reduction in annual demand of the existing customers will be approximately 2500 AFY by 2030.

Table 5-1 shows the projected demand in five-year increments, 2005 to 2030.

TABLE 5-1 DEMAND PROJECTIONS[a]

YEAR	DEMAND (AFY)
2005	17,300
2010	18,600
2015	20,100
2020	21,600
2025	23,300
2030	25,100

a. Refer to Table 4-3

City records provide a Vacant Land Inventory based on the City's General Plan shown in Figure 3 on page 6. The Vacant Land Inventory indicates 1033.82 acres are vacant and that 3,237 dwelling units could be developed. The Vacant Land inventory includes the Westside/SW Gateway area. Using the general plan population factors, development of the Vacant Land would result in a population growth of about 8,154 persons. The required Water supply to serve the development of the Vacant Land would amount to 2265 AFY. This estimate does not include the Planned Residential Reserve Area of the General Plan. The water supply required to serve the Vacant Land is part of the projected water demand presented in Figure 4-1 of UWMP.

The City has accepted that 15,000 AFY is the safe yield the groundwater basin can provide without experiencing significant drawdown of the water table, based upon the City's current developed land area. The Westside/SW gateway Project will expand the size of the City, increasing its ability to draw on the basin as agricultural uses are disbanded within the incorporated City limits, the safe yield would increase by 695 acre-feet per year.

Increase safe yield = project area * safe yield factor
=409.5 acres * 1.7
= 695 acre-feet per year

The City has determined that the relationship of the area of the City to the safe yield be estimated at 1.70 acre-feet per acre. The average per acre relationship of the safe yield has been calculated to be approximately 1.95 acre feet per acre per year. This calculation assumes the safe yield is uniform throughout the City. In practice, yields may vary throughout a region. For example, the groundwater safe yield in the Stockton area is 0.75 acre feet per acre per year which is 60% lower than the estimate for Lodi of 1.95 acre feet per acre per year. As the City of Lodi expands in land area, it is probable that the City's average safe yield will change. Therefore, for purposes of this WSA, the safe yield has been reduced for the newly annexed areas to 1.7 acre-feet per acre per year. Therefore, with annexation of the Westside/SW Gateway project, the City of Lodi's safe yield of the groundwater basin will increase to 15,695 AFY. Even though the current City needs exceed this amount, the basin has not yet demonstrated significant degradation and is still able to meet the City's needs in the short term. Regardless, the proposed project would contribute to this overdraft.

With the firm water supply of 21,000 AFY (15,000 AFY + 6,000 AFY) shown in the 2005 UWMP, plus an additional 695 AFY from the expansion of the City, the following Table 5-2 illustrates the projected water supply for the City with the Project included.

TABLE 5-2 WATER BALANCE CALCULATION (All Numbers are in AFY)

Existing Water Demand	17,011
Less Metered Reduction of 15% (per UWMP)	(2,500)
Westside/SW Gateway Water Demand*	887
Vacant Land Water Demand	1,378
TOTAL WATER DEMAND	**16,776**
Available Groundwater Supply	15,000
Available Groundwater Westside/SW Gateway	695
Available Surface Water Supply	6,000
TOTAL WATER SUPPLY	**21,695**
Available Reserve**	4,919

* See Table 5-3 for details.
** Total Water Supply less Total Water Demand

The ongoing water metering program and the implementation of a surface supply by the City will provide sufficient water to meet the projected needs of the City.

Table 5-2 above outlines the water balance for the City based on current use by existing development, projected demand by development of existing vacant land within the City and the additional demand generated by the development of the Westside/SW Gateway Project.

If development of Vacant Land is considered to occur over the planning period, the water demand resulting from development of the Vacant Land would be included in the overall demand calculations as presented in Table 5-2 and, therefore, demand would approximately equal the supply by about 2020. The City would need to plan to provide additional firm water supplies to serve growth beyond 2020.

Other Water Supply Considerations

The above scenarios are based on a static available supply, which is not practical for two reasons. First, as noted in the 2005 UWMP, the City is already considering obtaining additional surface water supplies from Woodbridge Irrigation District. The City also retained Schlumberger Water Services to prepare a “Surface Water Supply Options” study in 2004 to determine how best to utilize the newly acquired surface water. Second, the calculation of a safe yield for groundwater extraction of 15,000 AFY, outlined in the 2005 Urban Water Management Plan, and accepted by the City, was calculated based upon Lodi’s current water use less its proportion of the overall basin overdraft based on area. Therefore, as the City’s land area increases through annexations, the City’s estimated proportion of the safe yield of the aquifer will also

increase. The City has determined that the per acre relationship of the safe yield should be estimated at a conservative 1.70 acre feet per acre.

The current contract with WID for 6,000 AFY also provides for carry over or banking of water not taken over the first three years of the agreement not to exceed 18,000 acre feet. The City may take delivery of the banked water over the 40-year term of the agreement. The agreement also provides for later delivery of water if delivery is curtailed by dry years. The WID reports that in the past 16 years, their entitlement has only been curtailed in two years (back-to-back). (Anders Christensen, WID General Manager to Lodi City Council, June 21, 2006) The City's contract provides that curtailment amounts are "banked" on paper and are to be made up in wetter years. Thus, the impact of short-term increases in groundwater pumping will be mitigated. When the WID surface water supplies and banked water are added to the groundwater supplies, water supplies will be available for the projected planning period of 2005 to 2030 and beyond.

The improvements to implement the use of the surface water are included in the City's planning as well as consideration of other appropriations discussed in the Schlumberger report. While all routes to obtain new water sources need to be studied, they are not relevant to this Water Supply Assessment as the Contract with WID provides a firm water supply that the City has committed to utilize and will be able to make available to provide supplemental water to meet project and other future demands through 2030.

The City is not obligated to reduce the recommended safe yield relationship of 1.95 acre feet per acre, but has voluntarily agreed to implement this reduction in the near term. Until the WID surface water supply is on-line, the City will continue to utilize existing groundwater supplies.

The City has developed a comprehensive approach to address the groundwater overdraft issue. The City's 2005 Urban Water Management Plan identifies the following five strategies that are being implemented to resolve the overdraft issue.

1. **Establishment of a Water Conversation Program.** The City has already established a Water Conservation Ordinance and a Water Conservation Rebate program that has shown reductions in demand. Continued implementation of these programs will reduce the current overdraft condition and will eventually develop surplus capacity that could be used to meet the needs of the Project.
2. **Establishment of a Recycled Water System.** The City has developed a water reuse program and is treating water for reuse at the Wastewater Treatment Plant. Currently, this water is being distributed to area farmers, thereby reducing their groundwater and surface water demands and improving the overall regional water balance. Expansion of this program is being planned and the incorporation of recycled water for landscape areas and other acceptable uses will further reduce demand on the groundwater basin.

3. **Development of Groundwater Recharge Systems.** The City is looking into groundwater recharge systems. Such systems are not currently considered for the Westside/SW Gateway project, although other developments around the City are including such systems to provide additional groundwater recharging, thus improving the City's water balance.
4. **Development of Surface Water Treatment.** The City has acquired an additional 6,000 AF of water rights from Woodbridge Irrigation District. The City is considering developing a water treatment plant to provide additional water supply for the City consumers. This surface water could also be used as groundwater recharge supply as an alternative as outlined above.
5. **Development of Additional Water Wells.** Wells provide an efficient means of providing for peak day and peak hour water demands by providing a distributed water source system. Adding additional wells does not necessarily increase groundwater usage, especially if those wells are used primarily to meet peak day, peak hour or emergency water demands. Alternately, implementation of additional storage may reduce the need for more peak wells.

The project to implement use of the WID surface water is anticipated to be developed before 2010. Prior to 2010, the proposed project would rely on the groundwater basin for water supply. As presented in Table 5-3, the proposed Project is projected to use 887 AFY.

Water conservation and water meter retrofit programs have been implemented by the City to reduce water demands within the community. These programs will continue and expand in the future. Recycled water use has been implemented at White Slough Water Pollution Control Facility to reduce agricultural demands on the groundwater basin. Expanded recycled water use programs are under study and will be implemented in the future. As presented in Table 5-2, the long-term water demands for the community will be served by a conjunctive supply program including groundwater, surface, and conservation.

Effect of the Westside/SW Gateway Project

Based upon the planned land uses for the Westside/SW Gateway Project shown in Table 1, on page 1, the estimated project demand was calculated using Standard demand rates as outlined in the Water Distribution Systems Handbook, by Larry W. Mays, McGraw-Hill 2000. Expected demand increase for the project has been calculated as 887 AFY.

TABLE 5-3 ESTIMATED WATER DEMAND – WESTSIDE/SW GATEWAY PROJECT

LAND USE TYPE	LAND USE AREA (ACRES)	DEMAND FACTOR (GALLONS PER DAY PER ACRE)	AVERAGE DAILY DEMAND (GALLONS PER DAY)
Commercial			
Commercial	0	0	0
Subtotal	**0**	**0**	**0**
Office			
Office	0	0	0
Subtotal	**0**	**0**	**0**
Residential			
LDR	230	1,670	384,100
MDR	51	2,610	133,110
HDR	29	4,160	120,640
Subtotal	**310**		**637,850**
Parks/Open Space			
Community Park/Basin	31.05	2,020	62,721
Neighborhood Park/Upland	12.45	2,020	25,149
Trail system	6.50	2,020	13,130
Subtotal	**50**		**101,000**
Public Facility			
Fire Station	1.0	1,700	1,700
Aquatic Center	4.70	2,020	9,494
School	24.6	1,700	41,820
Subtotal	**30.3**		**52,014**
Roadway			
Roadway ROW	19.2	0	0
Subtotal	**19.2**	**0**	**0**
TOTAL	**409.5**		**791,864**
		ESTIMATED TOTAL	**887 AFY**

Currently, the Westside/SW Gateway project would have a minor effect on the City's water supply system. As shown above, based on projections for the Project, the estimated Project demand would be an increase of about 5% of the current water deliveries.

The safe yield for groundwater extraction outlined in the Urban Water Management Plan and accepted by the City is 15,000 AFY. Adding the Westside/SW Gateway

Project annexation and using a ratio of 1.70 as determined by the City may ultimately increase the safe yield to 15,695 AFY but the designated water supply for the project is surface water purchased from WID. The Westside/SW Gateway Project water demand will initially begin at zero and gradually increase to 887 AFY as the project is developed. The phased increase in demand will allow for the City to implement a program to use the surface water.

CONCLUSION AND RECOMMENDATIONS

- The current water supply of the City of Lodi is consistent, reliable, and meets all EPA quality requirements. The quantity is adequate for the projected growth as presented in the 2005 UWMP.
- Water supplies are available to serve the Westside/SW Gateway Project in accordance with the requirements included in SB 610. The total available supply of 21,695 AFY exceeds the projected demand of 16,776 AFY.
- The Westside/SW Gateway project will utilize ground water for interim supply by continuing to install wells to meet project demands. Long term, Westside/SW Gateway water demands will be met using surface water purchased from WID.
- Surface water is available under the WID contract and will be developed independently by the City on the City's schedule.
- City should continue the program to install water meters and to encourage water conservation.
- City should pursue expansion of the recycled water program to include landscape areas, parks, and other acceptable uses.

At the time of preparation of this analysis, the City of Lodi is considering two annexations, Westside/SW Gateway project and the Reynold's Ranch project. These projects are independent and will be considered for approval separately. Increasing the area of the City with the addition of both project areas also increases the City's proportion of the safe yield to 16,069 AFY.

If both projects are approved and using the information developed in the Westside/SW Gateway and Reynold's Ranch Water Supply Assessment, the water balance calculation would read as shown in Table 5-4 on the following page.

TABLE 5-4 WATER BALANCE CALCULATION (ALL NUMBERS ARE IN AFY)

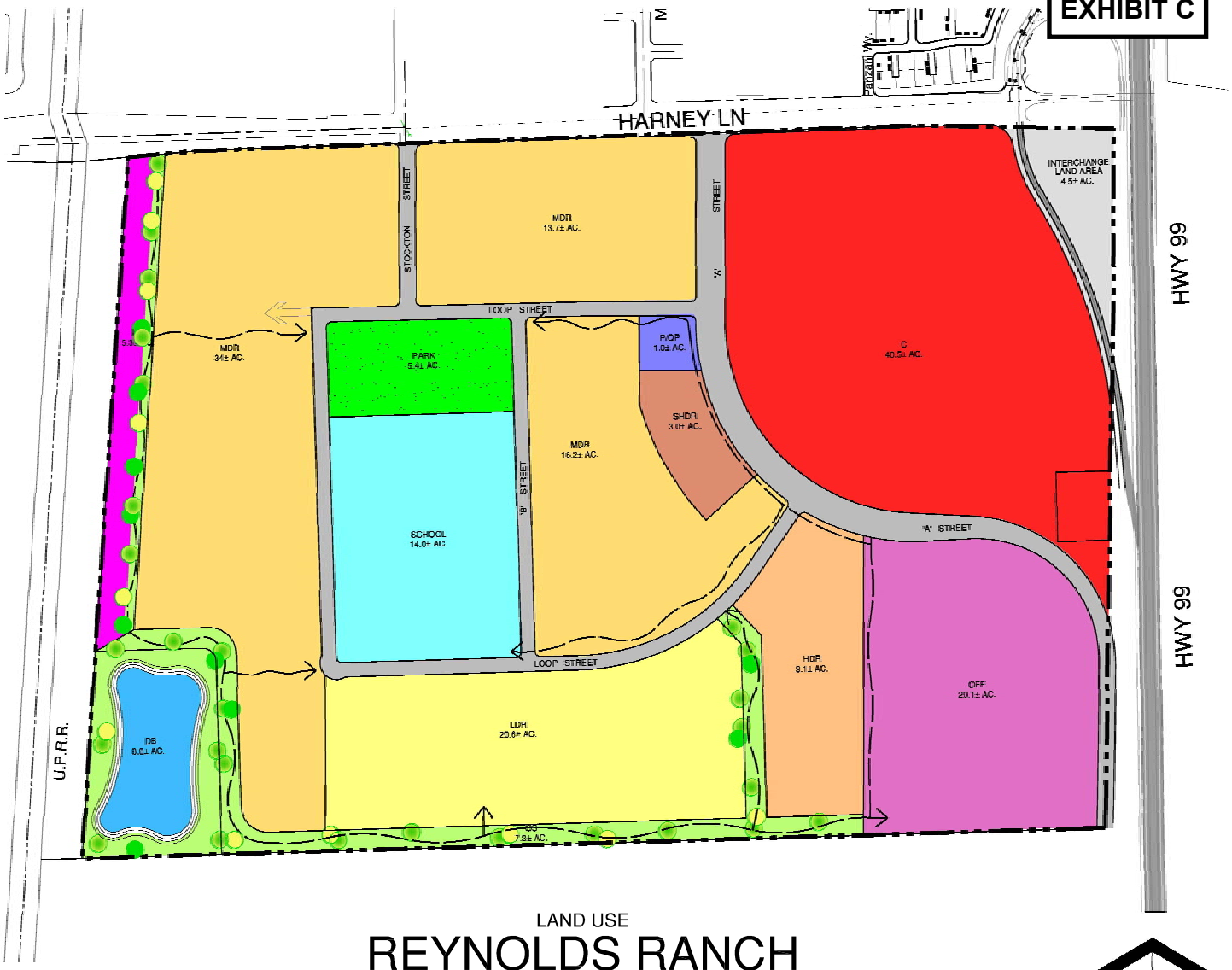
Existing Water Demand	17,011
Less Metered Reduction of 15% (per UWMP)	(2,500)
Westside/SW Gateway Water Demand*	887
Vacant Land Water Demand	1,378
Reynold's Ranch Water Demand**	501
TOTAL WATER DEMAND	**17,277**
Available Groundwater Supply (with annexation)	15,000
Westside/SW Gateway	695
Reynold's Ranch	374
Available Surface Water Supply	6,000
TOTAL WATER SUPPLY	**22,069**
Available Reserve***	4,792

* See Table 5-3 for details
** See Reynold's Ranch project WSA, Table 5-3, for details.
*** Total Water Supply less Total Water Demand

With the Westside/SW Gateway and Reynold's Ranch projects, the water supply for single and multiple dry year conditions will exceed the projected demand.

Based upon the above analysis, the cumulative effect of the addition of both projects does not alter the conclusions and recommendations for each project.

EXHIBIT C



LAND USE

REYNOLDS RANCH

CITY OF LODI, CALIFORNIA

LAND USE SUMMARY

LAND USE		ACRES	FIXED COUNT	UNITS
LDR	LOW DENSITY RESIDENTIAL	20.6	5 DU/AC	103
MDR	MEDIUM DENSITY RESIDENTIAL	63.9	10.3 DU/AC	631
HDR	HIGH DENSITY RESIDENTIAL	9.1	22 DU/AC	200
SHDR	HIGH DENSITY RESIDENTIAL- SENIOR	3.0	50 DU/AC	150
C	RETAIL COMMERCIAL	40.5		
OFF	OFFICE	20.1		
MS	MINI STORAGE	5.3		
P/QP/FIRE	PUBLIC / QUASI PUBLIC	1.0		
S	SCHOOL	14.0		
PARK	NEIGHBORHOOD PARK	5.4		
OS	OPEN SPACE	7.3		
DB	DETENTION BASIN	8.0		
I/OR	INTERCHANGE/ON-RAMP	4.5		
IS	INTERNAL STREETS	17.3		
TOTAL		220.0		1,084

FIGURE 1
REYNOLDS RANCH
WATER SUPPLY ASSESSMENT

EXHIBIT D-1

FIGURE 1
LODI GENERAL PLAN
WATER SUPPLY ASSESSMENT

EXHIBIT D-2

LSA

FIGURE III-10

LEGEND

ONE ACRE OF THIS PARK MAY BE USED FOR A FUTURE FIRE STATION

0 400 800
FEET

Lodi Annexation EIR
Conceptual Site Plan for
Southwest Gateway Project

SOURCE: DAHLIN GROUP, MARCH 2006

I:\LOD531 wside swgate\figures\Fig_3VB8.ai (3/17/06)

FIGURE 2
LODI GENERAL PLAN
WATER SUPPLY ASSESSMENT

RESOLUTION NO. 2006-143

A RESOLUTION OF THE LODI CITY COUNCIL
APPROVING WATER SUPPLY ASSESSMENT
REPORT FOR REYNOLDS RANCH PROJECT

WHEREAS, the Reynolds Ranch project site is located south of Harney Lane, west of State Highway 99, and east of the Union Pacific Railroad; and

WHEREAS, the Reynolds Ranch project is 220 acres in size, and the land uses include 20 acres of offices, 40 acres of retail commercial sites, 1,084 residential units (mix of low, medium, and high density), parks, elementary school, and other uses; and

WHEREAS, the annual water supply required to serve the demands of the project at completion is approximately 501 acre-feet per year; and

WHEREAS, the Water Supply Assessment for Reynolds Ranch was prepared by Public Works Department staff and Willdan Consultants, in accordance with Senate Bill (SB) 610 and Water Code Section 10912; and

WHEREAS, the assessments are in the format designated in State guidelines and document that sufficient water supply is available to serve the project; and

WHEREAS, no entitlements are conferred upon this project by approving the Water Supply Assessment Report; and

WHEREAS, approval of the Water Supply Assessment Report is a prerequisite to certification of the Final Environmental Impact Report.

NOW, THEREFORE, BE IT RESOLVED that the Lodi City Council hereby finds as follows:

1) The data presented in the assessment report confirms that water supplies are sufficient during normal, single-dry and multiple-dry years over a 20-year planning horizon to serve the demands of existing development, planned future development within the General Plan, and this proposed project; and

2) The Lodi City Council hereby approves the Water Supply Assessment Report for Reynolds Ranch Project and concludes that there is sufficient water supply available to serve this project.

Dated: July 19, 2006

I hereby certify that Resolution No. 2006-143 was passed and adopted by the City Council of the City of Lodi in a regular meeting held July 19, 2006, by the following vote:

AYES: COUNCIL MEMBERS – Beckman, Hansen, and Johnson

NOES: COUNCIL MEMBERS – Mounce and Mayor Hitchcock

ABSENT: COUNCIL MEMBERS – None

ABSTAIN: COUNCIL MEMBERS – None

Jennifer M. Perrin

JENNIFER M. PERRIN
Interim City Clerk

RESOLUTION NO. 2006-144

A RESOLUTION OF THE LODI CITY COUNCIL
APPROVING WATER SUPPLY ASSESSMENT REPORT
FOR WESTSIDE-SOUTHWEST GATEWAY PROJECT

WHEREAS, the Westside-Southwest Gateway project site is located westerly of Lower Sacramento Road extending to the General Plan boundary; and

WHEREAS, the project is approximately 410 acres in size, and the land uses include 2,090 residential units, elementary school, parks, and other uses; and

WHEREAS, the annual water supply required to serve the demands of the project is approximately 887 acre-feet per year; and

WHEREAS, the Water Supply Assessment for Westside-Southwest Gateway Project was prepared by Public Works Department staff and Willdan Consultants, in accordance with Senate Bill (SB) 610 and Water Code Section 10912; and

WHEREAS, the assessments are in the format designated in State guidelines and document that sufficient water supply is available to serve the project; and

WHEREAS, no entitlements are conferred upon this project by approving the Water Supply Assessment Report; and

WHEREAS, approval of the Water Supply Assessment Report is a prerequisite to certification of the Final Environmental Impact Report.

NOW, THEREFORE, BE IT RESOLVED that the Lodi City Council hereby finds as follows:

1) The data presented in the assessment report confirms that water supplies are sufficient during normal, single-dry and multiple-dry years over a 20-year planning horizon to serve the demands of existing development, planned future development within the General Plan, and this proposed project; and

2) The Lodi City Council hereby approves the Water Supply Assessment Report for Westside-Southwest Gateway Project and concludes that there is sufficient water supply available to serve this project.

Dated: July 19, 2006

I hereby certify that Resolution No. 2006-144 was passed and adopted by the City Council of the City of Lodi in a regular meeting held July 19, 2006, by the following vote:

AYES: COUNCIL MEMBERS – Beckman, Hansen, Johnson, and Mayor Hitchcock

NOES: COUNCIL MEMBERS – Mounce

ABSENT: COUNCIL MEMBERS – None

ABSTAIN: COUNCIL MEMBERS – None

Jennifer M. Perrin

JENNIFER M. PERRIN
Interim City Clerk

Summary of Water Supply and Demands

Water Supply	Acre Feet per Year
Groundwater[a]	15,000
Supplemental Safe Yield (Reynolds Ranch)[b]	374
Supplemental Safe Yield (Westside-Southwest Gateway)[b]	695
Woodbridge Irrigation District[C]	6,000
Reduction in Demand through Conservation and Metering[d]	2,500
Total Supply	24,569
Water Demand	
Existing City	17,011
Reynolds Ranch	501
Westside-Southwest Gateway	887
Vacant Land[e]	1,378
Total Supply	19,777
Surplus Supply	4,792

[a] Safe yield of the groundwater resource underlying the existing City.

[b] Increase in safe yield of the groundwater resource underlying the project area, calculated as the product of 1.7 acre-feet per year per acre times the acreage of the project.

[c] Although an implementation plan for the use of the WID surface water has not been decided upon, credit for the supply is permitted by the WSA Guidelines.

[d] Projected reduction of 15% of existing water demand through meter installation and other conservation measures. This does not apply to new construction because the effects of metered water and conservation measures are accounted for in the calculation of water demands.

[e] Remaining vacant land based on current General Plan.

CITY COUNCIL
SUSAN HITCHCOCK,
Mayor
BOB JOHNSON,
Mayor Pro Tempore
JOHN BECKMAN
LARRY D. HANSEN
JOANNE MOUNCE

CITY OF LODI

PUBLIC WORKS DEPARTMENT
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BLAIR KING,
City Manager

JENNIFER M. PERRIN,
Interim City Clerk

D. STEPHEN SCHWABAUER,
City Attorney

RICHARD C. PRIMA, JR.,
Public Works Director

July 13, 2006

Willdan Consultants
Jeff Atteberry
2399 Gateway Oaks Drive, Ste. 210
Sacramento, CA 95833

LSA Associates
Charity Wagner
2215 Fifth Street
Berkeley, CA 94710

SUBJECT: Adopt Separate Resolutions Approving Water Supply Assessment Reports for Reynolds Ranch Project and Westside-Southwest Gateway Project

Enclosed is a copy of background information on an item on the City Council agenda of Wednesday, July 19, 2006. The meeting will be held at 7 p.m. in the City Council Chamber, Carnegie Forum, 305 West Pine Street.

This item is on the regular calendar for Council discussion. You are welcome to attend.

If you wish to write to the City Council, please address your letter to City Council, City of Lodi, P. O. Box 3006, Lodi, California, 95241-1910. Be sure to allow time for the mail. Or, you may hand-deliver the letter to City Hall, 221 West Pine Street.

If you wish to address the Council at the Council Meeting, be sure to fill out a speaker's card (available at the Carnegie Forum immediately prior to the start of the meeting) and give it to the City Clerk. If you have any questions about communicating with the Council, please contact Jennifer Perrin, Interim City Clerk, at (209) 333-6702.

If you have any questions about the item itself, please call Wally Sandelin, City Engineer, at (209) 333-6709.

P. Farris

for: Richard C. Prima, Jr.
Public Works Director

RCP/pmf

Enclosure

cc: City Clerk

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